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MODERN MEDICINE AND BACTERIOLOGICAL REVIEW.

Bulletin of the Sanitarium Hospital and Laboratory of Hygiene.
SANITARIUM, BATTLE CREEK, MICH.

Edited by J. H. Kellogg M. D.

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THE publishers of MODERN MEDICINE will issue each month during the year 1896, under the above title, a brochure on some practical medical topic. The first number consists of a paper by Dr. J. H. Kellogg, entitled, "**What is the Matter with the American Stomach?**" which presents the results of new and interesting inquiries respecting the morbid conditions of the stomach, and their causes.

The following additional numbers are already in preparation :—

"**The Liver: Its Diseases and Modern Methods of Treatment,**" by Dujardin-Beaumetz.

"**Auto-Intoxication and Its Relations to Diet and Therapeutics,**" by Bouchard and Rogers.

"**The Importance of Intestinal Asepsis and Antisepsis in Abdominal Surgery.**"

"**Scoliosis: Its Etiology, and Rational Treatment by Massage, Swedish Movements, Gymnastics, and Electricity,**" by Dr. T. J. Hartelius, Director of the Central Institute of Gymnastics, Stockholm, Sweden.

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The Stomach:

Its Disorders and How to Cure Them.

BY J. H. KELLOGG, M. D.,

Superintendent of the Battle Creek (Mich.) Sanitarium, Member of the British and American Associations for the Advancement of Science, the American Microscopical Society, the Society of Hygiene, of France; Author of the Home Hand-Book of Domestic Hygiene and Rational Medicine, Etc., Etc.

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The special opportunities afforded the author as superintendent of the Battle Creek Sanitarium, and of the research laboratories connected with the institution, have enabled him to make a most exhaustive study of this subject; and he has undertaken to present in this little work the results of more than twenty years' investigation and experience in the treatment of the various forms of the disease commonly known as "dyspepsia."

The work is thoroughly practical, first giving a brief but very complete account of the process of digestion and the composition of food, then considering the various causes of indigestion, and afterward taking up, one by one, the leading symptoms of indigestion and the several varieties of dyspepsia, together with the appropriate treatment of each. Careful directions are given for the application of all the different remedies recommended, which include more than twenty carefully prepared Diet Lists.

The work concludes with an explanation of the new and elaborate method of investigating disorders of the stomach, in use at the Battle Creek Sanitarium, and is largely the result of researches undertaken there. The following is the list of the leading sections in the book: The Organs of Digestion; Foods; The Digestive Fluids; General View of the Digestive Process; The Maladies of the Modern Stomach; Important New Discoveries Relating to Digestion; Symptoms of Dyspepsia; The Symptomatic Treatment of Indigestion; Remedies for the Home Treatment of Dyspepsia; Quacks and Nostrums; Explanation of the Author's Graphic Mode of Representing the Results of Stomach Work, Obtainable from Examination of the Stomach Fluid by the System of Investigation Employed in the Hygienic and Research Laboratories of the Sanitarium at Battle Creek, Mich., U. S. A.

The work describes such of the various methods of treatment employed at the Battle Creek Sanitarium in the treatment of digestive disorders as can be carried out by the individual at home, giving especial attention to those which experience has shown to be the most essential and efficient.

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—AND—

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a m	p m	p m				p m	p m	pm		a m
9.00	3.10	8.15	a m	.....	.....D.Chicago A.....	6.45	1.50	9.10	.....	7.50
11.25	5.05	10.30	6.00	.....	.....Valparaiso.....	5.05	11.35	7.10	.....	5.45
p m										
1.05	6.30	12.00	10.05	.....	.....South Bend.....	3.10	10.15	5.44	.....	4.10
1 46	7.12	1.45	12.40	.....	.....Cassopolis	2.15	9.40	5.13	.....	3.28
2.33	.....	†1.33	3.42	.....	.....Schoolcraft.....	1.20	.....	.....	.....	.....
2.44	7.55	1.48	4.30	a m	.....Vicksburg.....	1.10	8.52	.....	p m	2.37
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6.30	10.45	5.03	.....	9.30	.....Durand.....	9.35	6.05	1.55	6.50	11.28
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8.42	a m	6.35	.....	11.06	.....Imlay City.....	7.28	.....	.....	4.48	.....
9.50	1.00	7.30	.....	12.05	.....Pt. H'n Tunnel.....	6.50	3.50	11.55	3.50	8.45
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9.25	.....	.....	.....	.....	..... Detroit.....	.....	.....	10.40	4.05	8.45
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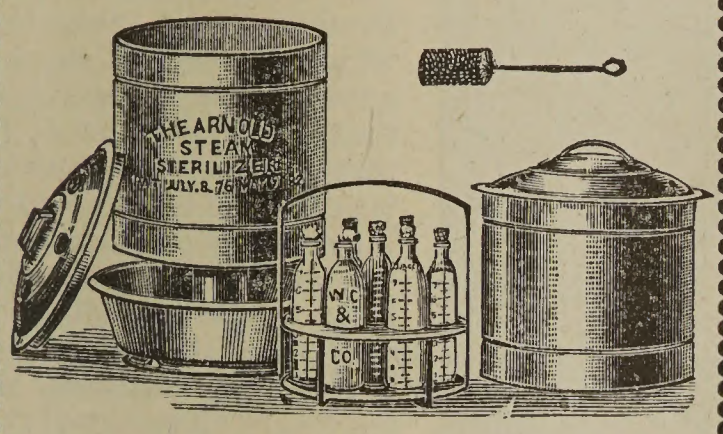

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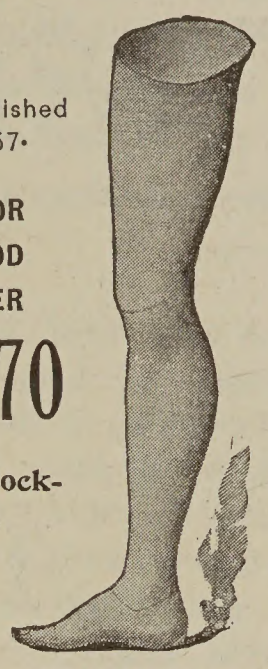

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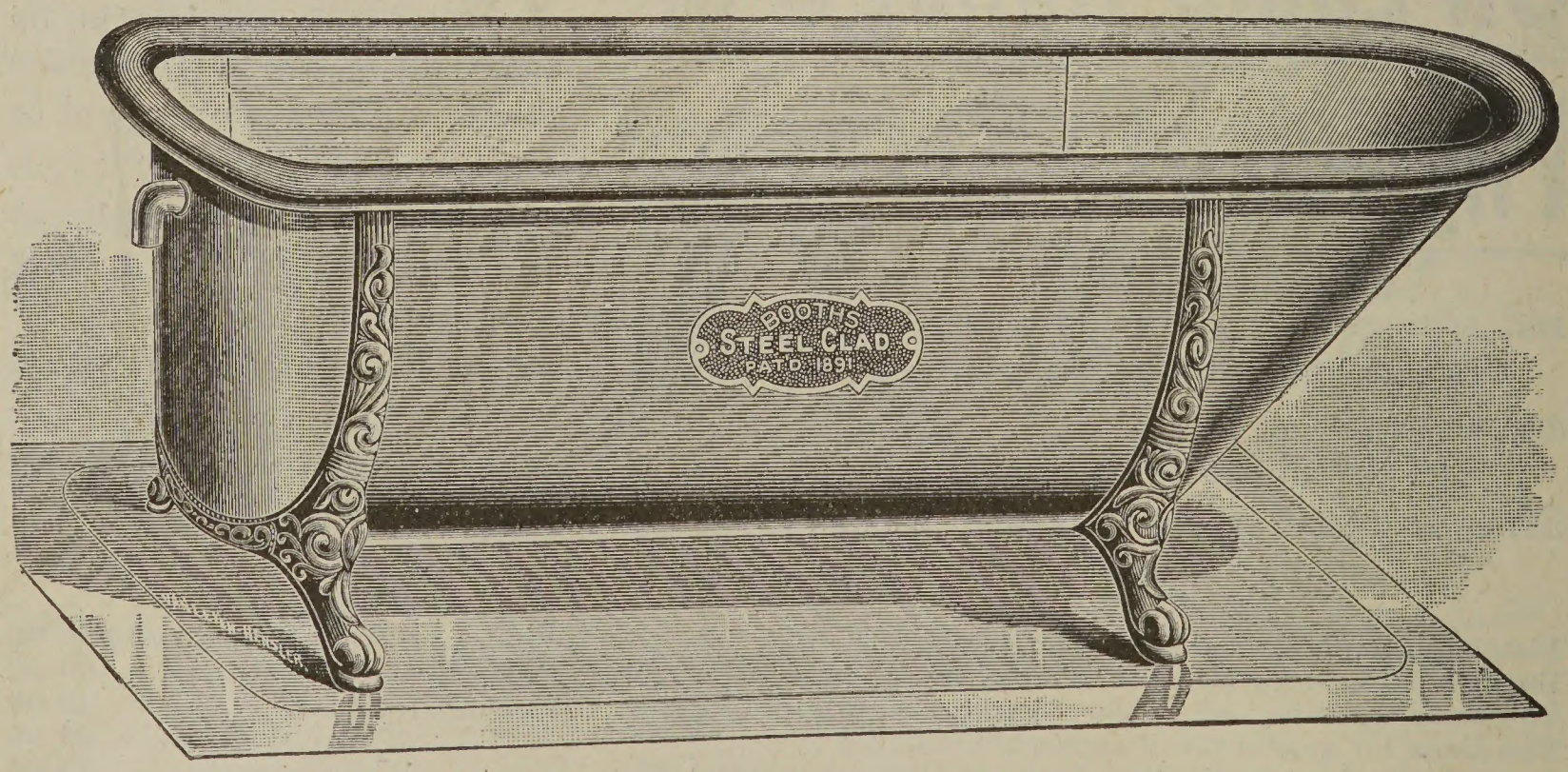

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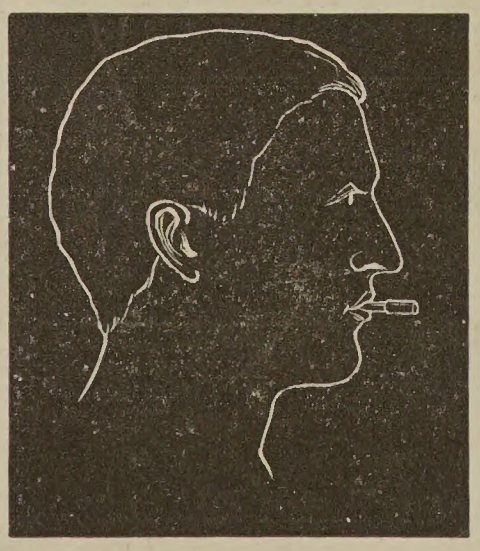

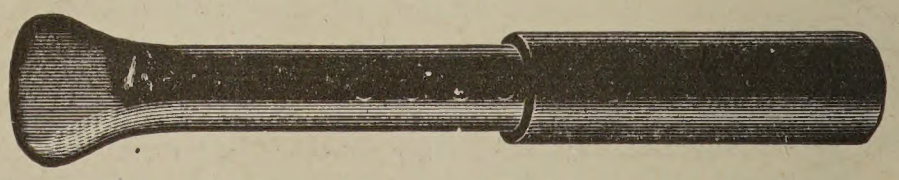

The experiments of Waldenburg, the eminent specialist in pulmonary diseases at St. Petersburg, long ago demonstrated the value of modifications of the respiratory pressure as a curative means in the treatment of pulmonary disease. Special value attaches to increase of respiratory pressure for the reason that this **expands collapsed air cells,** and hence antagonizes the destructive tendency of consumption, and removes the disabling effects left behind pleurisy and pneumonia. The so-called pneumatic treatment of these maladies has scored more triumphs than any other one method. **The most important and useful effects** of pneumatic treatment may be obtained without the aid of the expensive apparatus ordinarily employed, by the use of the expiration tube, a cut of which is herewith shown.

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CLASSIFICATION OF FUNCTIONAL DISORDERS OF THE STOMACH,

IN RELATION TO PROTEID DIGESTION,

Based upon a Quantitative Chemical Examination of the Stomach Fluid Obtained after a Test Meal, in over 5,000 Analyses.

By J. H. KELLOGG, M. D.

The symbols under each head indicate the characteristics of each individual form of quantitative disturbance to which the stomach is subject.

HYPERPEPSIA. A′ +.

1. A′ + H + C + Typical. (Both HCl and combined chlorine in excess.)
   - 1. $a =$ { 1. Without fermentation (x 0). 2. With " (x +).
   - 2. $a -$ { 1. Without fermentation (x 0). 2. With " (x +).
2. A′ + H 0, — or = C + (Without excess of free HCl [H].)
   - 1. $a =$ { 1. Without fermentation (x 0). 2. With " (x +).
   - 2. $a -$ { 1. Without fermentation (x 0). 2. With " (x +).
3. A′ + H + C — or = (Without excess of combined chlorine [C].)
   - 1. $a =$ { 1. Without fermentation (x 0). 2. With " (x +).
   - 2. $a -$ { 1. Without fermentation (x 0). 2. With " (x +).

HYPOPEPSIA. A′ —.

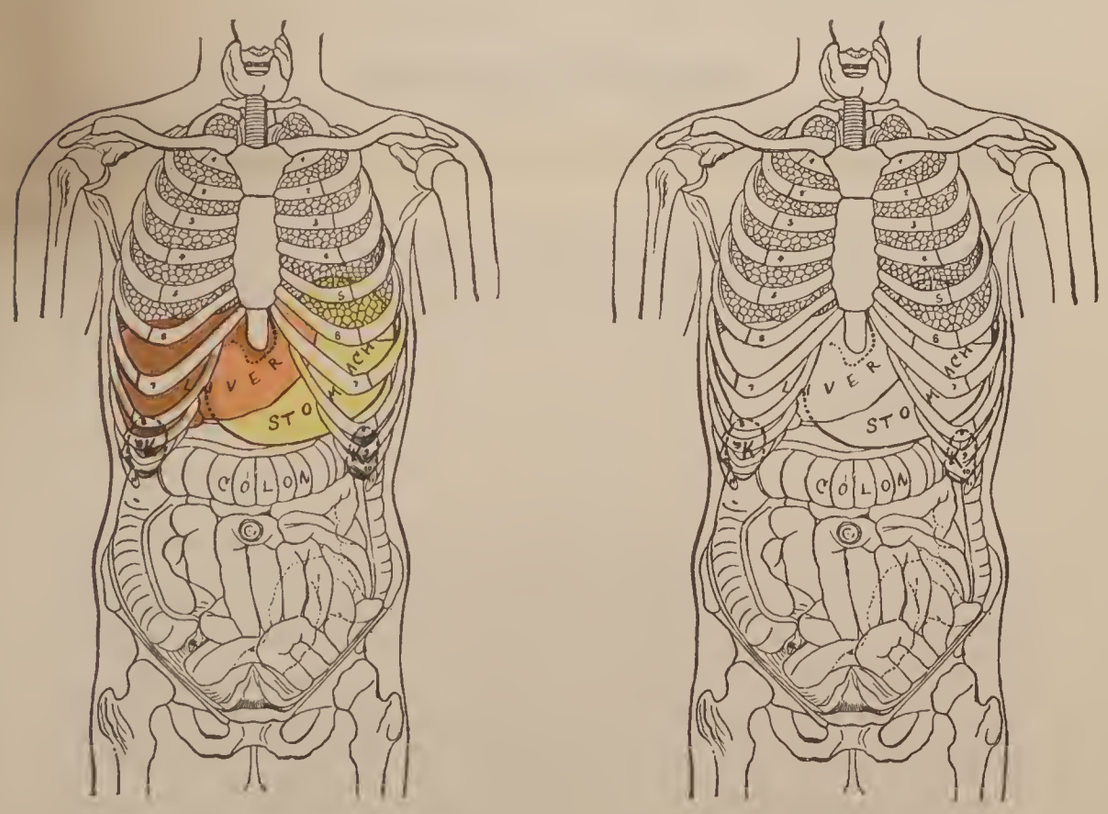
1. A′ — H — or 0 Typical. (All elements deficient.)
   - 1. $a =$ { 1. Without fermentation (x 0). 2. With " (x +)
   - 2. $a -$ { 1. Without fermentation (x 0). 2. With " (x +)
2. A′ — H = or + (Without deficiency of HCl [H].)
   - 1. $a =$ { 1. Without fermentation (x 0). 2. With " (x +).
   - 2. $a -$ { 1. Without fermentation (x 0). 2. With " (x +).

APEPSIA. A o or — a o or — H o.

1. Without fermentation (x 0).
2. With " (x +).

SIMPLE DYSPEPSIA. A′ =.

1. $a =$ { 1. Without fermentation (x 0) (normal). 2. With " (x +).
2. $a -$ { 1. Without fermentation (x 0). 2. With " (x +).



Results of Physical Examination Respecting the Position of the Stomach and other Abdominal Organs.

EXPLANATION OF CLASSIFICATION.

In the study of over 5000 stomach fluids, I have found it possible to include all cases of disorder of the chemico-vital processes of the stomach, as regards proteid digestion, in four general classes: *Hyperpepsia, hypopepsia, apepsia,* and *simple dyspepsia* (following the classification of Hayem and Winter). Hypopepsia and hyperpepsia present respectively two and three main subdivisions, each of which, together with simple dyspepsia, is divided into two tpyes, according as coefficient (a), the measure of the quality of proteid digestion is, = or —. Each of these types, together with apepsia, is again subdivided in relation to fermentation, into two classes, without fermentation and with fermentation. The characteristics of these several classes, subdivisions, and types are as follows: —

HYPERPEPSIA.

The characteristic feature in hyperpepsia is A′+. The significance of this is that the free HCl and combined chlorine (H + C) are found in quantities sufficient to produce nominal hyperacidity, there being excess of stomach work, not regarding quality. There are three subdivisions: —

1. Hyperpepsia typical, all kinds of work in excess (A′ + H + C +).
2. Hyperpepsia without excess of HCl (A′ + H — or = C +).
3. Hyperpepsia without excess of combined chlorine (A′ + H + C — or =).

Each of the subdivisions of hyperpepsia presents two types: —

(1.) $a =$, signifying that the proteid digestion is normal in quality.
(2.) $a -$, signifying that the proteid digestion is inferior in quality, neutral chloro-organic compounds being present.

Each type is subdivided, with reference to fermentation, into two classes: —

[1.] Without fermentation (x 0).
[2.] With fermentation (x +).

HYPOPEPSIA.

The characteristic of hypopepsia is A′ —, the significance of which is that H and C are not found in sufficient quantities to produce a normal degree of acidity. There are two subdivisions of hypopepsia: —

1. Hypopepsia typical (A′— H —).
2. Hypopepsia without deficiency of HCl (A′— H = or +).

Each of the subdivisions of hypopepsia presents two types: —

(1.) $a =$, signifying that the proteid digestion is normal in quality.
(2.) $a -$, indicating the presence of neutral chloro-organic compounds.

Each type is subdivided, with reference to fermentation, into two classes: —

[1.] Without fermentation (x 0).
[2.] With fermentation (x +).

APEPSIA.

In apepsia there is no normal proteid digestion. The characteristics are a neutral or very slightly acid stomach fluid (A o or —); the coefficient of proteid digestion is zero (a o). There are two subclasses in apepsia: —

1. Without fermentation (x o).
2. With fermentation (x +).

SIMPLE DYSPEPSIA.

The characteristic of simple dyspepsia is A′=, the significance of which is that H and C are present in sufficient quantities to produce a normal degree of acidity. Simple dyspepsia presents two types: —

(1.) $a =$, signifying that the proteid digestion is normal in quality.
(2.) $a -$, signifying that neutral chloro-organic compounds are present.

Each type is subdivided, with reference to fermentation, into two classes: —

[1.] Without fermentation (x o).
[2.] With fermentation (x +).

For convenience in writing prescriptions these general classes are designated as follows: Hyperpepsia, Hyp.; hypopepsia, Hop.; apepsia, Ap.; simple dyspepsia, Sp.

The subdivisions under each class are designated by number as follows: Hyp. 1-1-1 would indicate a case falling under the first subdivision of hyperpepsia, of the first type ($a =$), without fermentation; Hyp. 3-2-2 would indicate a case belonging to the third subdivision of hyperpepsia, second type ($a -$), and with fermentation; Hop. 2-1-2 would indicate a case of the second division of hypopepsia, of the first type ($a =$), with fermentation; Ap. 2 would indicate a case of apepsia with fermentation; Sp. 1-2 would indicate a case of simple dyspepsia of the first type ($a =$), with fermentation.

Explanation of Symbols.— The quantities which are utilized as a basis for the classification of cases in relation to proteid digestion, are A′, H, C, L, a, and x. The significance of these several symbols is as follows: —

A represents the total acidity as determined by acidimetry.

A′ represents the acidity indicated by the amount of free HCl and combined chlorine present (H + C), the combined chlorine being taken at its full value. The value of A′ in a given case is determined by simply adding the quantities represented by H and C. This value shows the quantity of work done without reference to quality, and is the basis for the division of cases into the four great classes: *Hyperpepsia, hypopepsia, apepsia,* and *simple dyspepsia.*

H represents the quantity of free HCl found by quantitative estimation.

C represents the amount of combined chlorine present in a given case when the proteid digestion is normal in quantity. The combined chlorine represents the same degree of acidity as the free HCl. There is likely to be present, however, a greater or smaller quantity of neutral chloro-organic compounds, which, possessing no acid value and no nutritive value, give to C, as determined by the estimation of chlorine, a value greater than it really possesses. The true value of C is shown by a, the coefficient of proteid digestion.

L represents the amount of lactic acid found present, expressed in terms of HCl. The actual amount of lactic acid is twice that indicated, but its acid value alone is of interest in this connection.

a, the coefficient of proteid digestion, represents the real value of the work done. It is determined by the following formula: $\frac{A-(H+L)}{C}$. a is simply a numerical expression of the nutritive value of the combined chlorine represented by C, its true acid value and its nutritive value being considered as identical. As the value of the combined chlorine is rarely found at par, the coefficient is considered to be normal when it does not fall more than 10% below par (.90 to 1.00 is considered as $a =$).

x is the coefficient of fermentation and indicates the amount of fatty acids present. It is based upon an actual determination of the amount of lactic acid and volatile fatty acids present. When this amount is less than .005 grams per 100 c.c., the case is considered normal (x o). If a larger quantity of fatty acids is found present, the case is considered to be one in which fermentation is present (x +).

m is the coefficient of HCl formation. It is obtained by the formula $\frac{T-F}{T}$, in which T represents the total chlorine and F the fixed chlorine. The normal relation of the chlorine set free from the basis, to the total chlorine is .66. To put the result on the basis of 100, in harmony with other coefficients, it is only necessary to divide the figures obtained from the formula by .66, or multiply by .015.

a and **x** as a mixed coefficient: In cases in which a sufficient amount of stomach fluid for the quantitative estimation of the fatty acids (lactic, butyric, etc.) cannot be obtained, approximate information in regard to the presence or absence of fermentation, and the amount of fatty acids present, may be obtained by the formula $\frac{A-H}{C \times .90}$. If the result is greater than unity (1 +), fatty acids are probably present; certainly so if the figures are much above unity. If the result is less than unity (1 —), fatty acids are either not present or the quantity present is insufficient to neutralize the neutral chloro-organic compounds represented in C, and consequently cannot be very great. When determined in this way, the coefficient is mixed, and relates to both fermentation and proteid digestion, and hence is represented as a and x.

GRAPHIC REPRESENTATION

Of the Results of the Chemical Examination of Salivary and Gastric Digestion, Based upon the Study of over 5000 Cases in the Physiological Laboratory of the Battle Creek (Mich.) Sanitarium.

Case of..... ARRANGED BY J. H. KELLOGG, M. D.

A′	H	C	A	S	COEFFICIENTS OF DIGESTIVE WORK.						
					Chlorine Liberation.	Fermentation.		Starch Digestion.	Salivary Activity.	Solution.	Absorption.
	Free HCl.	Combined Chlorine.	Total Acidity.	Starch Digestion.	m	a	x	b	c	y	z
.430	.240	.410	.480	7.00	2.00	6.00	100	2.00	10.00	2.00	6.00
.410	.225	.390	.440	6.50	1.90	5.00	80	1.90	9.00	1.90	5.00
.390	.210	.370	.410	6.25	1.80	4.50	60	1.80	8.00	1.80	4.00
.370	.195	.350	.385	6.00	1.70	4.00	50	1.70	7.00	1.70	3.00
.350	.180	.330	.360	5.75	1.65	3.50	40	1.65	6.00	1.65	2.50
.335	.165	.315	.340	5.50	1.60	3.00	30	1.60	5.50	1.60	2.25
.320	.150	.300	.320	5.25	1.55	2.75	25	1.55	5.00	1.55	2.00
.305	.135	.285	.305	5.00	1.50	2.50	20	1.50	4.50	1.50	1.75
.290	.120	.270	.290	4.75	1.45	2.25	18	1.45	4.00	1.45	1.50
.275	.110	.255	.275	4.50	1.40	2.00	16	1.40	3.50	1.40	1.40
.260	.100	.240	.260	4.25	1.35	1.75	14	1.35	3.00	1.35	1.35
.245	.090	.225	.245	4.00	1.30	1.50	12	1.30	2.50	1.30	1.30
.230	.080	.210	.230	3.75	1.25	1.40	10	1.25	2.00	1.25	1.25
.220	.070	.200	.220	3.50	1.20	1.30	8	1.20	1.75	1.20	1.20
.210	.060	.190	.210	3.25	1.15	1.20	6	1.15	1.50	1.15	1.15
.200	.050	.180	.200	3.00	1.10	1.10	4	1.10	1.25	1.10	1.10
.195	.044	.174	.195	2.75	1.05	1.05	2	1.05	1.10	1.05	1.05
.190	.038	.168	.190	2.50	1.00	1.00	00	1.00	1.00	1.00	1.00
.185	.031	.161	.185	2.25	.95	.95		.95	.90	.95	.95
.180	.025	.155	.180	2.00	.90	.90		.90	.80	.90	.90
.170	.024	.145	.170	1.80	.85	.85		.85	.70	.85	.85
.160	.023	.135	.160	1.60	.80	.80		.80	.60	.80	.80
.150	.022	.125	.150	1.40	.75	.75		.75	.50	.75	.75
.140	.021	.115	.140	1.20	.70	.70		.70	.40	.70	.70
.130	.020	.105	.130	1.00	.65	.65		.65	.30	.65	.65
.120	.018	.095	.120	.90	.60	.60		.60	.25	.60	.60
.110	.016	.085	.110	.80	.55	.55		.55	.20	.55	.55
.100	.014	.075	.100	.70	.50	.50		.50	.15	.50	.50
.085	.012	.065	.085	.60	.45	.45		.45	.12	.45	.45
.070	.010	.055	.070	.50	.40	.40		.40	.10	.40	.40
.055	.008	.045	.055	.40	.35	.35		.35	.08	.35	.35
.040	.006	.035	.040	.30	.30	.30		.30	.06	.30	.30
.025	.004	.025	.025	.20	.20	.20		.20	.04	.20	.20
.010	.002	.010	.010	.10	.10	.10		.10	.02	.10	.10
.000	.000	.000	.000	.00	.00	.00		.00	.00	.00	.00
					m	a		b	c	y	z

Imperfect Digestion of Albumen. IMPERFECTLY DISINTEGRATED. WELL DISINTEGRATED. SLOW ABSORPTION. RAPID ABSORPTION.

The figures in each of the above columns relate to a particular quantity or quality of stomach work. The point at which the line starts indicates the class to which the case belongs, and the degree of hyperpepsia or hypopepsia, as the case may be, if the figures fall outside the normal limits.

The figures found in columns headed **A′, H, C, A,** and *a* relate to the digestion of albuminoids, or proteid substances.

The column headed **S** relates to the salivary digestion of starch, the figures having reference to the quantity of sugar (maltose expressed as milligrams of dextrose) found present in the stomach fluid.

Coefficients.—The columns headed *a*, *b*, *c*, *x*, *y*, and *z* relate to the coefficients of the several kinds of work done by the stomach.

Column **a** relates to proteid digestion and fermentation. The figures below the normal line in this column represent varying degrees of deterioration in the quality of the products of proteid digestion. The figures above the line to the left roughly indicate the degree of acid fermentation. Both conditions may exist together.

Coefficient **b** relates to the digestion of starch. The figures in this column represent the relation between the amount of maltose, or completely digested starch, found in the stomach fluid, and the total amount of sugar, soluble starch, and dextrine found present in the same case. The coefficient is determined by dividing the number of milligrams of maltose found in each 100 c.c. of stomach fluid by the total quantity of maltose, dextrine, and soluble starch found in solution. 1.00 of course represents the conversion of 80 per cent of the starch in solution.

Coefficient **c** represents the degree of secretory activity of the salivary glands and of the starch-converting power of the saliva. Normally, 10 to 12 c.c. of saliva are produced in five minutes, 1 c.c. of which is capable of completely converting .100 grams of starch in five minutes. Taking 10 as the normal quantity and 5 as the normal time, the coefficient of salivary activity is obtained by the following formula, in which Q represents the quantity secreted and T the time required for conversion: $\frac{5}{T} \times \frac{Q}{10} = c$ (coefficient of salivary activity).

Coefficient **x** represents the degree of fermentation present, as indicated by the number of milligrams of fatty acids per 100 c.c. of stomach fluid.

Coefficient **y** represents the total work of disintegration and solution performed by the mouth and the stomach. The figures representing this coefficient are obtained by dividing the amount of residue obtained by filtration of the stomach fluid, by the total amount of stomach fluid obtained. In normal cases the residue equals one half the total amount. The coefficient is found by the following formula, in which A represents the amount of stomach fluid and R the residue:

$\frac{A}{2R} = y, = 1.00$ (in normal cases)

Coefficient **z** represents the work of the stomach in the absorption of fluids. This coefficient is obtained by dividing the normal quantity of stomach fluid which should be obtained viz., 40 c.c., by the quantity actually obtained.

Coefficient **m** indicates the relative amount of chlorin liberated in the form of free hydrochloric acid.

Results of Qualitative and Quantitative Determinations Relating to Salivary Digestion and the Stomach Fluid Obtained after a Test Meal.

No...... .....

Mr..... **Date,**.....189..

Test Meal.—Regular Breakfast, after Lavage .....
Time of Digestion:.....h.....m.....

PHYSICAL AND MICROSCOPICAL CHARACTERS.

Physical. Normal.
Amount.....c.c. (40 c.c. 1⅓ oz.); Disintegration.....; Color.....
Residue.....grms. (20 grms.); Mucus.....; Odor.....

Microscopical.—Blood.....; Pus.....; Misc.....

Bacteriological.—No. of microbes per c.c. (30 c.c. = 1 oz.).....

General Characteristics .....

Yeast..... Mold.....

Acid formation.....Gas production.....Liquefying.....

COLORIMETRIC AND OTHER QUALITATIVE REACTIONS.

DIGESTIVE AGENTS.

Free HCl Congo Red.....Resorcine.....Dried Residue.....

Pepsin.... **Rennet Ferment**.... **Rennet Zymogen**.... **Bile**....

DIGESTIVE PRODUCTS.

Proteids.—Syntonine....Propeptone.... Peptone....Albuminoids....

Starch (Lugol's Sol.), Blue, Violet, Brown, Yellow, Colorless.

FERMENTATION PRODUCTS.

Lactic Acid..... Volatile Acids..... { Acetic..... Butyric..... Formic .....
Alcohol.....
Misc.....

QUANTITATIVE CHEMICAL DETERMINATIONS.

DIGESTION OF ALBUMEN.

Normal quantities.*

Total acidity, (A).....grms. (.180-.200 grms.) *A′*
Calculated acidity, (*A′*)**..... " " " A′
Total chlorine, (T)..... " (.300-.330 ")
Free HCl, (H)..... " (.025-.050 ") *H*
Combined chlorine, (C)..... " (.155-.180 ") *C*
Fixed chlorides, (F)..... " (.100-.110 ") $\frac{T-F}{T} = .66$

DIGESTION OF STARCH.

Saliva, Reaction { Acid..... / Alkaline..... } am't in 5 m.....grms. 1 c.c. converted .1 grms. in.....m.

Maltose, (M).....grms.
Dextrine and Soluble Starch (D)..... "
Fatty Acids (from fermentation) (L)..... "
(Lactic acid.....grms. Volatile Acids.....grms.)

COEFFICIENTS OF DIGESTIVE WORK.††

Gastric Digest'n { **Proteids** (*a*)..... **Fermentat'n** (*x*).. / **Starch** (*b*)..... **Solution** (*y*)..... / **Salivary Aetivity** (*c*)..... **Absorption** (*z*) ...
Relation of HCl set free to Total Chlorine (*m*).....
Proteid Digestion and Acid Fermentation (*a* and *x*).....

Diagnosis.—Classification.....
Remarks:.....
Prescription:.....
.....
.....

*The acidity (A and A′) and the quantities of chlorine in the different forms of (T), (H), (C), and (F), are expressed as HCl. The values given relate to 100 c.c. of stomach fluid. The amount of fatty acids, chiefly lactic (L), is expressed in grams of HCl, which should be multiplied by 2 to indicate the actual amount of lactic acid present. The amount of maltose (M) as well as that of soluble starch and dextrine (D) is expressed in grams of equivalent dextrose.

†By noting the sign following the symbols in this column and coefficients (*a*) and (*x*), and referring to the classification, the diagnosis of any case in relation to proteid digestion and fermentation may be easily made. By transferring the figures to the blank for "Graphic Representation," the indications will be seen at once, the analysis thus furnishing a basis for rational treatment and the proper dietary.

** The calculated acidity (A′) is determined by the following formula: C + H — L = A′.

†† The normal amount of work is, in the case of each coefficient, represented by 1.00. The figures given usually represent the percentage of deviation from normal. The coefficient of fermentation represents the number of milligrams of lactic acid or combined fatty acids found in each 100 c.c. of stomach fluid (expressed in equivalent HCl).

The sign + indicates presence in normal quantity; ++ in excessive quantity; — in deficient quantity; 0 (zero) wholly absent.

MODERN MEDICINE

• • AND • •

BACTERIOLOGICAL REVIEW.

VOL. V. BATTLE CREEK, MICH., U. S. A., FEBRUARY, 1896. NO. 2.

ORIGINAL ARTICLES.

WHAT IS THE MATTER WITH THE AMERICAN STOMACH?[1]

NEW AND EXACT METHODS OF FINDING OUT.

BY J. H. KELLOGG, M. D.,

Battle Creek, Mich.

SOME years ago a leading English practitioner remarked to me in London, "Doctor, I suppose that in America the business of physicians is chiefly confined to the treatment of indigestion." I replied that I had heard that Americans enjoyed the unenviable reputation of being a nation of dyspeptics; but yet we did sometimes encounter other pathological states than those of indigestion. Nevertheless, as the remark of the London physician has at intervals occurred to me, I have found myself recognizing more and more distinctly the fact that, after all, the practice of medicine, outside of surgery and obstetrics, for the most part revolves about the stomach.

Bouchard has shown the important relation of ptomains developed in a dilated or atonic stomach to chronic rheumatism, to bronchitis, to anginal cardiac affections, to albuminuria and renal diseases, to pulmonary phthisis, to jaundice, and to skin diseases. He has also shown the intimate relation which exists between putrefactive and fermentative processes taking place in any part of the alimentary canal, resulting in the production of ptomains and other toxins, to puerperal fever and febricula.

M. l'Gendre has shown the relation of dilatation of the stomach to typhoid fever, and to tapeworm, lumbrici, and other intestinal parasites, great and small.

Vigoroux asserts that the great number of functional nerve disorders which are included under the general term "neurasthenia" are all of gastric origin; that neurasthenics without exception are suffering from uric acid poisoning. Excess of uric acid in the tissues is, according to Bouchard, due to an abnormal slowing of the processes of oxidation and disassimilation, which results from a toxemia arising from the absorption of the products of putrefaction and fermentation in the alimentary canal.

Dana asserts that organic changes in the central nervous system are doubtless due to the absorption of toxic substances produced by microbic processes in the alimentary canal.

Thus we see that special investigators in the etiology of disease are from all quarters pointing toward the stomach as the starting-point of the train of morbid processes which give rise, in each particular case, to a special group of morbid manifestations. Unreasonable as this may at first seem, a glance at a few simple physiological facts may serve to dissipate the apparent absurdity.

The function of a tissue or organ depends upon its structure. The structure of every cell and fiber of the body depends upon the quality and quantity of the material absorbed from the alimentary canal. A deficient supply of food weakens the structure, and lessens the energy of every organ. An excess of food overwhelms the tissues with imperfectly oxidized and toxic substances, whereby their structure is deteriorated, and their functions perverted or retarded. Food containing toxic substances produces upon the body general or specific toxic effects. The same results from the development

[1] Presented at the Annual Meeting of the Mississippi Valley Medical Association, held at Detroit, Mich., Sept. 4–6, 1895.

of toxic substances in the alimentary canal from the fermentation or putrefaction of food in the stomach and intestines. Pasteur, David, and others have shown that the mouth, the stomach, and the intestines are continually inhabited by a vast number of microbes capable of generating various acids, poisonous ptomains and toxins, varying in their physical and physiological properties, and some of them capable of producing most powerful poisonous effects. These poisons are generally produced in greater or less quantities; but thanks to the poison-destroying power of the liver and the eliminative function of the kidneys, the amount at any time circulating in the tissues of a healthy man is not sufficient to produce any more deleterious effect than that gradual deterioration of the organism by which the tissue-modifications characteristic of old age are brought about. When, however, diseased conditions of the stomach or intestines exist, these poisons may be increased to an enormous degree; for example, Bouchard has shown that if food is retained in the stomach more than five hours, the changes which take place are fermentative and putrefactive, rather than digestive. This explains the relation demonstrated by Bouchard and others between dilatation of the stomach and chronic rheumatism and the lowered vital resistance which prepares the way for tubercular disease of the lungs and other structures.

A catarrhal condition of the stomach and intestines encourages general toxemia and the development of an infinite variety of pathological conditions, by furnishing, in the masses of the mucus retained in patches upon the mucous surface, hiding-places for microbes, in which they are protected from the germicidal action of the digestive fluids. The particular form of morbid manifestation which may arise from the poison thus engendered depends upon the special properties of the poisons which may happen to be formed in the greatest abundance, and upon the susceptibility of the individual tissues. Modifications of conditions may render poisons which at one time are comparatively inert, at another time highly toxic; for example, Klebs has shown that the highly toxic poison of cholera nostras is derived from guanidin, a comparatively slightly toxic substance always present in the tissues; and Griffith has shown that the toxins of scarlet fever and diphtheria which are found in the urine of patients suffering from these diseases are derived from creatin, a poison always present in the flesh of animals, but possessed of comparatively small toxic power. These facts explain the influence of habits and conditions of life in producing susceptibility to disease, and in determining the fatality of maladies.

A perfectly healthy man is proof against germs. Cholera germs, typhoid-fever germs, and other disease-producing microbes may be swallowed with impunity by a person whose alimentary canal is intact. The gastric juice of a healthy stomach is capable of destroying every germ that lives. Bile serves the purpose of an antiseptic for the intestines, as the gastric juice does for the stomach.

One of the most important functions of the stomach seems to be the disinfection of food. The idea that microbes and putrefactive processes are essential as an aid to digestion is an error which is supported by neither physiological proof nor bacteriological facts. The normal stomach is perfectly capable of taking care of itself, provided it has a favorable opportunity, as I will attempt to show later in this paper. Nature has thus undertaken to protect the body against the destructive influence of the poisons which might develop in the alimentary canal by means of the germicidal power of the gastric juice and the bile, and has afforded a protection against both the poisons which might be actually introduced with the food, and those which might result from bacterial action in the alimentary canal by means of the poison-destroying and the poison-retaining property of the liver, as well as by the marvelous eliminative activity of the kidneys.

So long as these protective agencies are in active operation, the body retains its ability to resist the attacks of microbes, and, provided other conditions are normal, the vital resistance of the body is sufficient to cope with natural disease-producing agencies. When the protective agencies are crippled; when the stomach no longer secretes a gastric juice capable of destroying microbes; and when it becomes, by dilatation or motor insufficiency, the hold of every unclean and hateful germ, the flood-gates of disease are thrown wide open, the portals of the vital citadel are unguarded, and the excit-

ing and predisposing causes of almost every ill to which human flesh is heir are set in operation. A clinical recognition of this fact has led many a wise old physician to insist upon the supreme importance of materia alimentaria as compared with materia medica, and to recognize the paramount importance of attention to the digestive functions in the treatment of maladies of every description.

Granting the force of these considerations, it becomes a matter of grave importance that we should enquire with great solicitude, What is the matter with the American stomach? That something is the matter is evidenced not only from the facts and arguments which have been presented, but from the facts which may be gleaned from a glance through the advertising pages of any medical journal, newspaper, or popular magazine, or by an inventory of any druggist's shelves or counters. The vast predominance of medicaments intended in some way to aid the digestive organs, over all other remedies either regular or irregular, is a patent fact. Pepsin is manufactured and sold by the ton. Peptones, peptonoids, malt preparations of various kinds, diastatic and other digestive ferments of every possible form, are manufactured and sold in enormous quantities, and swallowed with avidity by the victims of digestive disorders, in the vain hope of finding relief. The questions of most practical interest in this inquiry, are —

1. What are the causes of this general failure in digestion recognizable among the adult population of the United States?

2. By what means may the functional disorders of digestion and their consequences be remedied?

This subject is altogether too large to be comprehensively treated in a single paper, but I wish to call especial attention to the results of some investigations which I have undertaken, looking toward the solution of these questions, and which I believe throw some light upon them.

From Hippocrates down to the present time, medical literature has abounded with maxims relating to eating and other matters pertaining to digestion. Some of these are recognized as the natural outgrowth of experience. Others may have only a whimsical basis, or no other foundation than the fancy of some prejudiced observer, the prestige of whose authority, however, has been sufficient to give him a certain degree of permanence. The purpose of my inquiry has been to bring to bear upon the etiological and therapeutic questions relating to indigestion, the precise methods which recent advances in the modes of physical diagnosis pertaining to the stomach have enabled us to utilize.

NEW MODE OF INVESTIGATING DISORDERS OF DIGESTION.

Before detailing the experiments which I have made, I will briefly describe the method of investigation of the functional activities of the stomach employed by me. Some fifty years ago, Golding Bird, of Guy's Hospital, London, discovered the interesting fact that free hydrochloric acid may be separated from the gastric juice by distillation. Hayem and Winter, of Paris, developed from this fact a method of investigation of the digestive work of the stomach by which it was possible to determine not only the total amount of chlorin secreted by the stomach, but the exact relation of the different forms of chlorin,— free, combined, and fixed,— thus measuring the quantity and quality of the work done by the stomach in the digestion of proteids. Taking the work of Hayem and Winter as a basis, and adding thereto the results of the investigations of others, and the advantages of the experience gained in the careful chemical study of over five thousand stomach fluids, I have elaborated the method of studying stomach fluids which is illustrated in the blank for recording results which is shown herewith. The first page of this blank affords opportunity for recording (1) the physical and microscopical characters of the stomach fluid obtained after a test meal; (2) the colorimetric and other qualitative reactions relating to the digestive agents; (3) the digestive products and fermentation products; (4) the quantitative chemical determination relating (*a*) to digestion of albumen, (*b*) digestion of starch, (*c*) the fatty acids, and (*d*) the coefficients of the digestive work done. Of these coefficients I have established seven, as follows: —

1. Relating to the digestion of albumen.
2. Relating to the digestion of starch.
3. Relating to the activity of the saliva.
4. Coefficient of fermentation.
5. Coefficient of solution.

6. Coefficient of absorption.
7. Coefficient of chlorin liberation.

On the fourth page of the blank is shown a graphic method of recording the results obtained by these exact determinations. On pages 2 and 3 is presented a a classification of the functional disorders of digestion based upon a chemical examination of the stomach fluid obtained after a test meal in over five thousand analyses.

Considered in relation to the amount of work done, there are four general classes of indigestion: Hyperpepsia, in which there is excessive stomach work; hypopepsia, in which there is deficiency of stomach work; apepsia, in which there is no digestive activity whatever; and simple dyspepsia, in which the change in the work done by the stomach is normal, the change in the stomach work being qualitative rather than quantitative. By these studies I have been enabled to subdivide these several classes as follows: —

Hyperpepsia, into three principal classes and twelve subclasses.

Hypopepsia, into two principal classes and eight subclasses.

Apepsia, into two subclasses.

Simple dyspepsia, into four subclasses.

This makes twenty-six different varieties of indigestion, each with its individual characteristics. The study of over fifty-three hundred analyses made with painstaking accuracy accords with the methods which I have very briefly described. I have not found a single case which did not fall in one of the classes named, and have found examples of every class, although some of the classes have been represented by but a very few cases. I conclude from this fact that this classification is complete.

I will not here enter into the details of classification, as this is shown in the blank referred to, which also sets forth the particulars of the method for obtaining the several coefficients. The technique of the chemical methods employed I have given in other papers; my present purpose is simply to exhibit the fact that the method of investigation is not hypothetical nor uncertain, but has a definite and scientific foundation. One feature of the method of investigation pursued is to such an extent new, and develops facts so interesting, that I may be pardoned for presenting it at length. It has relation to the digestion of starch in the stomach.

THE STOMACH DIGESTION OF STARCH.

The subject of the stomach digestion of starch is one which seems to have been almost wholly neglected until very recently; and even yet the majority of our text-books on physiology teach that the digestion of starch in the stomach is a matter of little or no consequence, the supposition being that the activity of the saliva ceases very soon after the food enters the stomach, in consequence of the inhibitory action of the gastric juice. Within a few years, however, the fact has been established that the active principle of the gastric juice converts starch into maltose, not only in a slightly alkaline medium, but also in the neutral or even slightly acid medium; and that, in fact, the digestion of starch proceeds more actively in a neutral medium than in one which is alkaline. Hence the alkalinity of the saliva appears to have for its purpose, not the direct increase of the activity of the ptyalin, but the prolonging of its action after it enters the stomach by the neutralization of the acidity of the gastric juice. Thus the saliva is enabled to act in the stomach with even greater rapidity than in the mouth, and may continue this action for half an hour or more after the food has been swallowed. This is amply sufficient time to enable the saliva, if a sufficient quantity of it is mixed with the food, to convert into maltose a large portion of the farinaceous constituents of the food, provided the food has been sufficiently well divided to present a surface large enough to bring the saliva promptly into contact with every particle of the digesting mass.

I have studied the salivary digestion of starch by two methods: —

1. By the establishment of a coefficient of salivary activity. This is done by a comparison of the quantity and quality of the saliva with the normal standard. The quality of the saliva is determined by the method of diastasimetry devised by Sir Wm. Roberts, an English physiologist, some years ago. The saliva is obtained by making the patient chew a quantity of paraffin gum for five minutes.

2. By the determination of the relative amounts of maltose, dextrin, and soluble starch found in the stomach fluid. The coefficient of starch digestion in the stomach is based upon a comparison of the amount of maltose with the amount

of dextrin and soluble starch. The saliva acting upon the starch in a test-tube is capable of converting eighty per cent. of it into maltose. Probably a larger per cent. than this is converted in the stomach on account of the absorption of the maltose as formed, but I have thought it best to take eighty per cent. as the standard for comparison; that is, to require that the stomach fluid, to be normal, shall show but twenty per cent. of dextrin and solubl starch to eighty per cent. of maltose.

I have been surprised at the large amount of maltose found present in the stomach fluid. In an examination of 965 stomach fluids by this method, I have found an average of 2.3 grams of maltose per 100 c. c. of stomach fluid, or 2.3 per cent. of maltose. The average amount of maltose, dextrin, and soluble starch combined, representing the total digestive work of the saliva, is nearly four grams, or four per cent. In some instances I have found as much as seven grams, or seven per cent.

An interesting fact which I have constantly noted is the much higher percentage of maltose in cases of hypopepsia as compared with hyperpepsia; for example, the average proportion of maltose in hyperpepsia is 1.9 grams per 100 c. c. of stomach fluid, and in hypopepsia 2.6, or 35 per cent. more than in hyperpepsia. The average coefficient of salivary activity is precisely the same in hyperpepsia and hypopepsia, showing clearly that the difference must be due to the difference in the acidity of the stomach contents. The averagey per cent. of maltose in twent cases of pronounced hyperpepsia was 1.8, and the coefficient .60. In eighteen cases of pronounced hypopepsia or apepsia, the per cent. of maltose was 3.7 and the coefficient .89. In other records the total amount of maltose in hypopepsia was more than double that in hyperpepsia, and the ratio of complete conversion was fifty per cent. greater. So much for the methods employed.

I will now call attention to the results of some experiments which I have made.[1] Selecting several healthy young men, by an extended series of experiments I undertook to determine some facts in relation to the hygiene of starch digestion. The above table represents the results obtained in a comparison of stomach fluids obtained after (1) water biscuit well chewed; (2) water biscuit broken, moistened with water, and swallowed without chewing; (3) raw flour; (4) raw wheat, the meal consisting of one and one-half oz. of solid substance mixed with eight oz. of water in each case.

EXPERIMENTAL RESEARCHES RELATING TO STARCH DIGESTION IN THE STOMACH.

	Water biscuit, well chewed. 1	Water biscuit, not chewed. 2	Raw flour. 3	Raw wheat. 4
Total acidity (A).....	.142	.140	.204	.136
Calculated acidity (A′).	.156	.132	.186	.128
Total chlorin (T).....	.296	.284	.332	.272
Free HCl (H).....	.050	.028	.056	.052
Combined chlorin (C)..	.106	.104	.130	.076
Fixed chlorids (F).....	.114	.152	.146	.144
Maltose (M).....	1.088	.272	.000	.000
Dextrin and soluble starch (D).....	.812	.548	.300	.448
COEFFICIENTS.				
Digestion of albumen (*a*)	.82	.97	1.00	1.00
Digestion of starch (*b*)..	.71	.42	.00	.00
Salivary activity (*c*)	1.17	1.11	1.14	1.37
Fermentation (*x*).....	5	11	6	6
Chlorin liberation (*m*)..	.80	.70	.85	.71

Several points of interest are to be noted in the foregoing table, the first and most conspicuous of which is the fact that the saliva did not act at all upon the raw flour and raw wheat, as shown by the total absence of maltose in the cases represented in columns 3 and 4. The small amount of dextrin and soluble starch shown was perhaps already present in the raw grain, but this point I have not investigated. It is clear, however, that no sugar was produced when raw starch was taken, whereas the amount of sugar produced after the ordinary test meal was more than 1 gram in each 100 c.c. of stomach fluid; in other words, the stomach fluid contained more than one per cent. of sugar without taking into account the amount which had been absorbed.

The figures for maltose in column 2 represent a test meal in which little or no saliva was mixed with the food substance, it being swallowed without chewing. Thus it indicates very slight action of the saliva, the amount of maltose found in the stomach fluid being but a trifle more than one fourth the amount obtained after an ordinary test meal. The amount of soluble starch and dextrin

1 A considerable portion of the following facts have been presented in another paper entitled, "Experimental Research Relating to Salivary Secretion and Digestion."

was less than half the normal amount in the case of the raw flour, and but little more in the case of the raw wheat.

Another point of interest is the increased amount of lactic acid found in the test meal taken without chewing, represented in column 2. The coefficient of fermentation which represents the number of milligrams of lactic acid (expressed in terms of HCl) found in 100 c.c. of stomach fluid, was more than double that found after the same kind of test breakfast properly masticated, represented in column 1. The results of this experiment distinctly associate fermentation with imperfect mastication and imperfect salivary digestion.

Another fact noted in a comparative study of the results of the analyses of over five thousand stomach fluids, which very strongly confirms this idea, is that starch conversion is usually complete in cases of apepsia, while lactic acid is conspicuous by its absence. In nearly all cases of apepsia which I have encountered, numbering about forty in all, the most delicate tests for lactic acid have failed to show its presence except in the most minute quantities; in most cases it was entirely absent.

Another fact of perhaps even greater interest has relation to the digestion of albumen when the wheat was eaten raw, in the form of either flour or wheat. The coefficient of proteid digestion in both cases, as is shown in columns 3 and 4, was 1.00, indicating perfect elaboration of the albuminoids. From this it appears that raw gluten, or the proteids of wheat, is digested more perfectly when taken in a raw state than when cooked, the very opposite of which we have seen to be true of starch.

The digestion of raw starch may take place in the intestines, by the action of the pancreatic juice, but cannot take place in the stomach, for the reason that the saliva has not the power to penetrate the cellulose envelope of the starch granule, and hence cannot digest raw starch. This fact coincides in a most interesting manner with the biological fact that man is by nature a frugivorous animal. In the process of ripening, the starch of fruits undergoes a hydration similar to that which takes place in cooking and in pancreatic digestion, whereby the insoluble starch is converted into soluble starch, dextrin, and sugar. This explains, also, why well-ripened fruit may be eaten raw with impunity, while unripe and farinaceous foods of all kinds require cooking. In his diet, man, like his nearest relative, the monkey, being naturally a frugivorous animal, may eat fruits in the state in which nature has provided them; but when he introduces other natural products into his bill of fare, he must adopt artificial means for securing the preparation for digestion which nature makes in the ripening process of fruits.

The coefficient of chlorin liberation (*m*) is very nearly uniform, indicating that the mastication and the cooking of food have little influence upon this digestive function.

The coefficient of salivary activity (*c*) was determined independently for each test breakfast. Its practical uniformity indicates that there was no essential change in the character or quality of the saliva to account for the differences shown by the totals in relation to the stomach digestion of starch.

(To be continued.)

A SUMMARY OF THE SYMPTOMS FOUND IN FIFTY-TWO CASES OF LOCOMOTOR ATAXIA.

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(Concluded.)

In the February number of the *Journal of Nervous and Mental Diseases*, 1895, Dr. Morton Prince gives a very interesting and valuable article on "Traumatism as a Cause of Locomotor Ataxia." In this article Prince describes quite fully two illustrative cases which show the liability to error in arriving at a conclusion in this matter when the statements of the patient are taken as a basis for an opinion. Dr. Prince thinks — and the point is well illustrated in the two cases which he reports — that a person may have locomotor ataxia for some months or even several years, without knowing it, or knowing that anything is specially wrong with him. Especially is this apt to be the case when the sensory symptoms are in abeyance. In view of this fact, Prince insists that the following rules must be strictly adhered to, in ex-

amining the evidence afforded by alleged individual cases : —

"1. The subject must have been proved free from tabes, either immediately before or immediately after an accident.

"2. The subject must be shown not to have been exposed to other known causes, as syphilis, for example.

"3. The trauma must have been of a nature to produce a physical or psychical impression of an appreciable degree, and not such a one as people are frequently exposed to without suffering afterward from tabes, *e. g.*, the extraction of a tooth or a mild bruise.

"4. The symptoms must have made their appearance within a reasonable time after the accident — at least within a year.

"5. The diagnosis must have been established beyond a reasonable doubt."

In this article Prince analyzes critically the evidence which is given in cases thus far reported in which traumatism was the supposed cause. He divides these cases into three classes : —

The first class, consisting of twenty-two cases, he considers inadmissible on account of the triviality of the injury, the pre-existence of syphilis, long interval between injury and onset of symptoms, doubtful diagnoses, etc.

The second class of cases, consisting of six, are those which cannot be excluded, but which from various circumstances are questionable in evidence.

The third class are those in which the disease was apparently caused by traumatism. Of these there are twelve cases. From those studied, Prince gives the following as the result of his investigation of this subject :—

"Taking all the facts above collated into consideration, it would seem that the current view that locomotor ataxia may be caused by traumatism, *per se*, irrespective of direct lesion of the cord, is not sustained by the published evidence thus far adduced. If such a relation exists, further evidence is required before it can be accepted. It would seem to be more probable, aside from mere coincidence, that when a sclerosis of the posterior column develops after a traumatism, the subject was already doomed to this condition, the process having already begun ; and that the traumatism, at most, but accelerated the development of the symptoms, and possibly of the anatomical process."

But what shall be said to be the cause of this disease? and what are the conditions necessary for its development? In the writer's opinion, there are two things, or conditions, necessary to the development of this disease in any individual. One of these is an organic predisposition to the disease; that is, a neuropathic condition,— a low resistance in the nerve elements. The other essential condition is the presence in the blood and tissues of a toxin, which in a very large proportion of cases is of syphilitic origin. This toxin in the case of syphilis is constantly formed in the body after it becomes once infected, and keeps up a continuous chronic intoxication for a period of several years, until finally the vitality of the tissues is overcome, and the symptoms of tabes begin to appear.

Other infections, both acute and chronic, besides that of syphilis, have been known to cause this disease. Cases are on record in which tabes developed after infection from tubercular disease and also from leprosy. These infections, like that of syphilis, are chronic ; that is, the germs of the disease remain in the system for a long period of time, and as the result of the life and activity of these germs, ptomains are constantly formed ; and consequently the system is kept in a state of intoxication for a period of months or even years. The disease may also follow or accompany infections of acute diseases, such as diphtheria and typhus and typhoid fever. It is a well-known fact that in many cases of diphtheria there is a post-diphtheritic paralysis. This is quite frequently supposed to be due to a neuritis which is a result of the action of diphtheria toxins upon the nerve fibers. This same poison may, and does, in some cases at least, produce tabes. In my own experience I have seen one well-developed case of locomotor ataxia (tabes dorsalis, follow an attack of typhoid fever.

There is, however, an essential difference between cases of tabes resulting from chronic infection like syphilis or tuberculosis, and those of an acute infection like diphtheria, typhoid fever, etc. In the first instance the disease, in the larger number of cases at least, is progressive, which is but a natural result if the body is constantly kept intoxicated by poisons that are formed by the infec-

tion of syphilis or tuberculosis. In the second instance, that is, where the disease develops from an acute infection, it becomes, after a period at least, regressive; it does not continue to progress as in the first instance. The best reason I can give for this difference is that in these cases poisons are formed in the body only for a limited period of time. The germs of diphtheria and typhoid fever remain in the system but a few weeks, and consequently the poisoning continues only for a limited space of time.

It is as unreasonable as it is unscientific, in the light of modern pathology, to suppose that a man in the prime of life, thirty years of age for instance, should be attacked with a disease like locomotor ataxia, which constantly progresses and becomes more severe in character and wider in extent, causing the individual to stagger through life, and finally totter into the grave, except there be in the body a cause that is constantly present and active. Certainly no good reason can be given why in a man of apparently good health there should begin to be formed on the posterior columns of the spinal cord a strip of sclerosed tissue, which constantly extends its borders, unless, as said before, there exists in the body a cause that is constantly acting. To say that this might be caused by perverted action on the part of the tissues,—a sort of bad habit, as it were,—is a very poor and unsatisfactory explanation. It does not give any reason why the disease should constantly progress as it does.

Besides the infections above referred to, chemical poisons may cause this disease. It is well known that poisoning from ergot, also from lead and mercury, is frequently followed by symptoms of tabes dorsalis. Besides these, poisoning from substances formed within the body in gouty, rheumatic, and diabetic diatheses is sometimes followed by symptoms of locomotor ataxia. Locomotor ataxia may also follow pernicious anemia.

I do not believe that mechanical injury, exposure to wet or cold, overwork, or sexual excesses without infection, can be regarded as exciting causes of tabes dorsalis *per se*. None of these influences, acting alone or in conjunction, could cause a bundle of nerve fibers to degenerate, and the adjacent connective tissue to increase until a well-defined, triangular band of sclerosed tissue is formed for a greater or less distance along the posterior part of the spinal cord. That these agents have some influence in exciting the disease in many cases is granted, but their action is in lessening the vitality of the nerve elements, and preparing them for another more active agent, which I believe is always a poison from some of the sources previously mentioned. The essential thing is a toxin in the blood, which may be a ptomain, a leucomain, or a chemical poison, either organic or inorganic.

With reference to the symptomology of tabes, I believe that this is fairly well represented in a report of the symptoms found in the fifty-two cases given herewith. Many of these are seldom noticed, or only lightly touched upon, by the majority of writers upon this subject; and they are even more frequently overlooked in examinations of patients suffering with this disease.

The symptoms apt to be overlooked in connection with this disease, are an exaggeration of the skin reflexes, partial deafness, and accelerated pulse. In addition to these there is in many cases considerable loss of weight, with more or less disturbance of the digestive organs, and very frequently a relaxed condition of the abdominal muscles, allowing the stomach and bowels, and sometimes other abdominal organs, to become prolapsed and displaced. This is often a very marked condition in locomotor ataxia.

Another fact that may be mentioned in this connection is that the knee-jerk is not always absent in locomotor ataxia, as is usually supposed. Of these fifty-two cases reported, it was found absent in forty-seven. Of the five remaining cases, it was present and apparently normal in two; present, but much diminished in one; present in one limb and absent in the other, in one case; and in one case it was certainly exaggerated. There is another class of cases of so-called ataxia paraplegia in which the knee-jerk is exaggerated; but in this class there is an actual paralysis present in the lower limbs, in addition to the symptoms of locomotor ataxia, and the lesion in the cord occupies a larger and entirely different territory than in typical locomotor ataxia. The case here referred to in which the knee-jerk was exaggerated does not belong to this class. In this particular instance there was no paralysis

of the lower limbs; and a careful study of the symptoms of the case would in no way warrant putting it in this class of so-called ataxia paraplegias.

Dr. S. Weir Mitchell, of Philadelphia, has reported a case in which the knee-jerk was exaggerated, but the symptoms of ataxia were in the upper extremities entirely.

With reference to exaggeration of the skin reflexes, in my own examinations I have found this condition in many cases which I have had an opportunity of examining at an early stage of the disease. As the malady progresses, the skin reflexes diminish, and finally disappear entirely, so that in most cases of tabes in the second or third stage of the disease the skin reflexes are entirely absent. I have found this exaggeration of the skin reflexes of great diagnostic value. Cases are frequently seen where in the early stages of the disease it is somewhat difficult to make an accurate diagnosis. The symptoms are not prominent, and perhaps a diagnosis must be formed upon only a general history of the case, together with two or three symptoms. In instances of this kind, when I have found the skin reflexes exaggerated, in connection with a few other symptoms pointing to the disease, I have usually had no trouble in making a diagnosis of locomotor ataxia.

The deafness which frequently occurs in those suffering with this disease I believe to be a part of the disease proper, and that it should be considered as forming a part of the symptom-complex which characterizes the trouble. The cause of the deafness is due to a lesion of the auditory nerve in some part of its course, similar to that which affects the roots of the spinal nerves. If these cases in which deafness is present are carefully examined and the cause of the deafness sought, it will nearly always be found to be of nervous origin, at least such has been my experience.

The rapid pulse which I have frequently noticed in these cases is probably due to an irritation of the pneumogastric nerve similar to that which in the spinal nerves produce sensory symptoms.

Another unusual symptom noted in connection with the study of these fifty-two cases was, in three cases, a dilatation of the pupil instead of a contraction, as is usually the case. In those cases in which the pupils were dilated, they did not respond to the light, and only very sluggishly to accommodation. In one of the fifty-two cases there was a trace of sugar present in the urine, which has been observed a few times in other cases of this disease.

Much valuable work has been done recently with reference to the pathogenesis of tabes. The old theory which considered the primary lesion in tabes as a degeneration of the posterior columns of the spinal cord, will, in the light of recent research, hardly hold. That there is a degeneration of the nerve fibers of the posterior columns of the cord is a well-established fact; but is this primary? or is it a result of another lesion, which, at least in a casual relation, antedates it?

Rindfleisch ascribes the origin of tabes to a slightly progressive inflammation of the pia mater, which by reason of tissue continuity gradually extends to the connective tissue of the cord, and there forms an interstitial myelitis, which results in a secondary degeneration of the nerve fiber of the cord. Obersteiner and Redlich have recently advocated a modification of this idea. They have attempted to determine the exact starting-point of the degeneration. By making oblique sections of the spinal roots in the direction in which they enter the cord, they have found that, normally, the roots are slightly constricted by a circular band of connective tissue of the pia mater.

In the early stage of tabes, the roots on the spinal side of the constriction are found degenerated; the cause of this degeneration is a hyperplasia of the connective tissue, which forms the constriction. This presses on the nerve fiber, and leads to its degeneration. The reason that the nerve fibers in Lissauer's boundary zone of the spinal cord suffer so early in the disease, is that in the spinal roots these fibers are located in the periphery, and consequently suffer most from the constriction. Nageotte, in the *Société de Biologie* of Nov. 10, 1894, gives his views of the primitive lesion of tabes. He believes that the initial lesion of tabes is a perineuritis, which affects the posterior spinal roots between the spinal ganglia and the point where the roots enter the sub-arachnoid space. The perineuritis at first partakes of the nature of an embryonic process, but later is fibrous in character. Following the inflammatory process is a degeneration of

the root fibers, which extends into the posterior columns of the cord. The anterior as well as the posterior spinal nerve roots are affected by the inflammation; but as they seem to have greater resistance, the motor nerve fibers are less liable to degenerate.

Professor Lyden, as early as 1863, expressed the opinion that the lesion in tabes begins in the posterior roots, and that the degeneration in the posterior columns of the cord is secondary. The researches of Obersteiner, Redlich, and Nageotte, previously referred to, as well as those of the French neurologists, Marie and Dejerine, concur in the opinion so long ago expressed by Lyden. As to the primary seat of the lesion in tabes, Marie, however, holds that it is in the ganglia of the roots, and not in the root fibers.

It seems quite well established, therefore, that the disease begins in the posterior spinal roots, either in the nerve fiber or the ganglia, the nature of the lesion being at first inflammatory, and affecting the connective tissue, and later, degenerative, affecting the nerve fibers.

The nerve fibers which form the posterior columns of the spinal cord are but the extension of those which make up the posterior spinal roots.

A lesion affecting the fibers of the posterior spinal roots would likewise affect those of the posterior columns of the cord. A lesion of the posterior roots would interfere with the nutrition of the fibers of the posterior columns of the cord by cutting them off from their center of nutrition, which is the spinal ganglia of the posterior roots.

With reference to the treatment of this disease, space will not allow a minute description. I can make only a few general suggestions. My own practise for some time past has been to direct the treatment along two lines; viz.,—

1. To eliminate poisons that are in all probability being constantly formed.

2. To improve the general health and nutrition of the patient, special treatment being directed to the seat of the lesion.

The first of these lines of treatments, that is, the elimination of poisons from the body, I believe can be best accomplished by the free use of water internally. I usually instruct my patients to drink from five to seven pints of water daily, and to take it in small quantities and at short intervals between meals. This flushes the tissues, and keeps the poisons that may be in the body in solution, thus favoring their elimination. It also increases the activity of the eliminative organs. In many cases it is best to have the patient drink the water hot. Besides this, the use of warm baths, particularly the electric-light bath, which is usually very agreeable to these patients, is to be highly recommended. This does good, not only by the elimination of poisons, but also by relieving the distressing pains which are so troublesome in this disease. By correcting all bad habits, prohibiting the use of tobacco and alcohol, and placing the patient on an aseptic diet, the further intoxication of the body from without becomes almost impossible.

The second indications for treatment are best met by the proper use of hydrotherapy, electricity in its various forms, massage, and other manual and mechanical movements, including suspension treatment. I am satisfied from the results of the treatment in a large number of cases of this kind, that a great deal more can be done for patients suffering from this disease than is usually supposed. I do not myself lay claim to any superior wisdom or extraordinary skill in managing these cases; but I believe from my own experience that when they can be put under proper conditions,— the daily life of the patient controlled, and the treatment above indicated intelligently applied,— as much can be accomplished in this malady as in many other diseases affecting other parts, which are generally considered less intractable.

It is certainly unjust to tell a man suffering with locomotor ataxia in the first or second stage of the disease that nothing can be done for him; I have had many cases concerning which such statements had been made by physicians, and yet, after taking the course of treatment as indicated, they have materially improved, the disease being checked in its onward progress, and the patient put in a position where he could be of practical service to himself and to his friends. And this is as much or more than is done in the treatment of numerous other diseases which are not supposed to be so formidable as tabes dorsalis. I therefore wish to emphasize the fact that by the use of proper treatment much can be done for patients suffering with this disease.

A NATURAL ABDOMINAL SUPPORTER.

BY J. H. KELLOGG, M. D.

THE labors of Glenard, Trastour, and other French investigators have brought clearly to light the exceeding prevalence of enteroptosis, or prolapse of the abdominal viscera, among civilized women, especially those who have borne children.

Many women, particularly those of feeble muscular development, and hence most women in civilized countries who are not accustomed to active muscular pursuits, suffer after confinement from a relaxed condition of the abdominal mus-

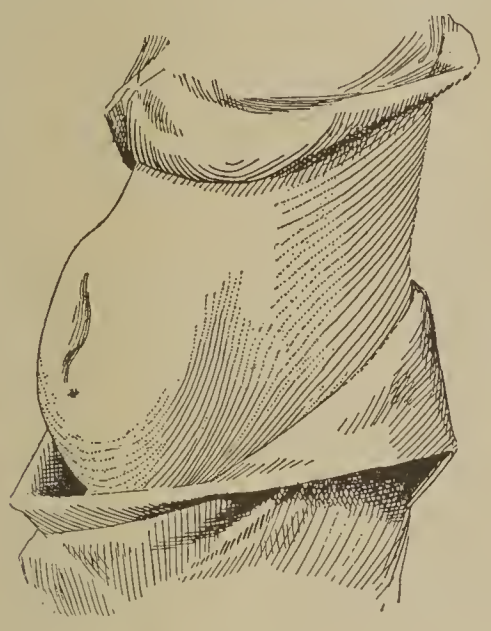

FIG. 1.

cles, and in consequence, prolapse of the bowels, stomach, and often the liver and kidneys. A great variety of nervous troubles and other disorders, such as constipation, indigestion, headache, and still more serious maladies, as Bright's disease and consumption, are the outgrowth of this prolapse of the viscera. Backache, of which so many women complain, is more commonly due to this cause than to any derangement of the pelvic organs, although displacements of the womb and ovaries and inflammation of these organs are very likely to follow displacement of the abdominal viscera.

As a precaution against this unfortunate consequence of the long-continued stretching of the abdominal muscles during pregnancy, and the inability of the undeveloped muscles to at once contract after childbirth so as to properly support the internal organs, it is important that artificial means should be employed for a time after confinement, to support the abdominal contents in place. Various abdominal supporters have been recommended for this purpose, but few have been found satisfactory. Supporters which are applied to the whole abdominal wall are unsatisfactory for the reason that the lower anterior portion of the abdomen is the only point where the support is really required.

The Natural Abdominal Supporter.—This instrument, well shown in the accompanying cuts, has been devised for the purpose of supporting the contents of the abdomen, when prolapsed, by a means as natural as possible.

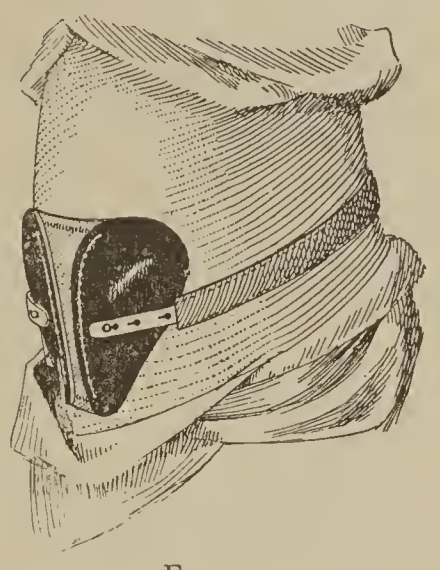

FIG. 2.

Patients have often said to the writer, "When I am on my feet, I feel that I must hold myself up with my hands," at the same moment placing the hands across the lower abdomen and making a pressure upward. Taking a hint from this, I have prepared the supporter which is herewith shown, and which consists of two hard rubber pieces, connected by an elastic webbing, which rest against the lower abdomen, being carefully shaped so as to make a uniform pressure; and second, a set of steel springs attached to a back piece and so adjusted as to make pressure upon the hard rubber plates simultaneously in a backward and upward direction. The action of the supporter

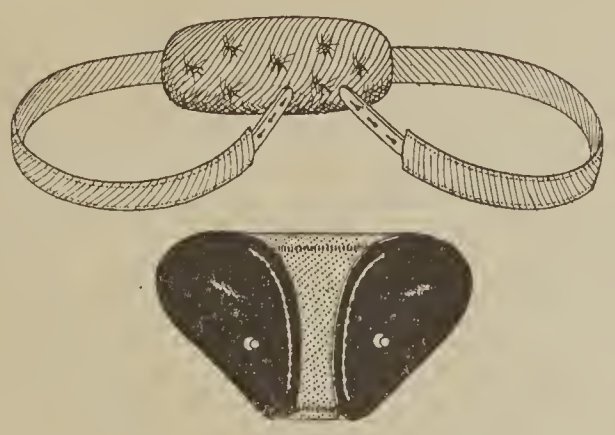

FIG. 3,

is almost a perfect imitation of the hands in lifting the prolapsed abdominal contents. After trying every form of supporter offered in the market, I have found "The Natural Abdominal Supporter" more satisfactory than any other, and have employed it in a very large number of cases. It is manufactured and sold by the Modern Medicine Co., Battle Creek, Mich.

TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

ELECTRICITY IN MEDICINE.

DR. MORTON, in a recent paper in the New York *Medical Journal*, makes the following valuable summary of the medical uses of electricity: —

"(1) I would suggest as a definition of electrotherapeutics, in a biological sense, that it is the transformation (by the law of conservation of energies) of electric energy into the energy peculiar to vital cells.

"(2) Electricity in medicine must be regarded not as an entity, like a drug, but as having a variety of 'properties,' such as electrolysis, cataphoresis, contraction of protoplasm, etc., each of which properties may be employed, singly or combined, to combat given morbid conditions or diseases.

"(3) Of the galvanic current it may be concluded,—

"(*a*) That strong currents depress nutrition of tissues and produce structural changes leading to physiological atrophy (twenty to a hundred milliampères).

"(*b*) That mild currents stimulate nutrition and produce physiological hypertrophy (one to eight milliampères).

"(*c*) That mild galvanic currents, pulsating or alternating, produce similar effects to mild continuous currents.

"(*d*) That the negative pole is specifically indicated in that large class of cases termed chronic inflammation where newly formed fibrous tissue or exudate occurs.

"(*e*) That upon the writer's theory — already accepted by several prominent physiologists — and observations, that catabolic or destructive events in tissue uniformly present the sign of negativity,— that is to say, are at their origin electropositive (resembling the zinc of a voltaic cell), the negative pole is indicated to arrest the catabolism, the positive to augment it.

"(*f*) That the positive pole is rarely indicated, and, if so at all, upon the basis of an electrotonic effect to produce sedation of neuralgic pain in superficial nerves.

"(4) Of the faradic current it may be concluded,—

"(*a*) That its main uses are to tetanize muscle and to cause sedation of pain.

"(*b*) That the tetanizing current as now employed to treat paralyzed muscles is injurious, since it enfeebles the muscle and causes atrophic structural changes.

"(*c*) That to strengthen or properly exercise a paralyzed muscle, a slow rhythm of the faradic current — about thirty waves to the second — should be adopted.

"(*d*) That in some spastic conditions of muscles (due to paralysis of an opposing group) the strong tetanizing current may be used to advantage to overstimulate, and thus to fatigue the muscle.

"(5) Of the franklinic current, or static electricity, it may be concluded that it is an adjunct of great efficiency in practise, since —

"(*a*) It evokes the usual nerve and muscle reactions.

"(*b*) It affords a most convenient means of stimulating the peripheral distribution of the nerves in the skin, producing counter-irritating, reflex, and other afferent impression effects.

"(*c*) It has a local perturbatory action (spark).

"(*d*) It produces profound alterations in the metabolism of the individual, increasing the natural waste-products and diminishing the toxic or by-products. For this reason it is specifically indicated in cases of malnutrition, whether local or general."

Treatment of Yellow Fever. — Morin, a French naval physician who has had a very large experience in the treatment of yellow fever, sums up the rational treatment of the disease as follows: —

"1. Employ internal antiseptics to weaken as far as possible the infective agent.

"2. Combat as far as possible the paralyzing effect of the toxin produced by the disease upon the circulation.

"3. Stimulate, as far as possible, the absorption of the inflammatory exudates."

Morin does not employ either salicylate of soda or antipyrin, in consequence of their deleterious effects upon the kidneys. He also avoids purgatives, in consequence of their irritating effect upon the stomach and bowels. He considers quinine a good preventive remedy taken in tartaric acid lemonade.

Lumbo-Abdominal Fluctuation.— Professor Bard, of Lyons, has discovered that fluctuation in ascites can be readily felt by striking with one hand upon the region of the quadratus lumborum, while the other is placed successively upon different parts of the abdomen. This is considered by Professor Bard as an early sign of ascites; and when one hand is placed near the median line in front, the deceptive sensation produced by the transmission of the vibratory movement through the tissues is obviated. The patient is placed in a sitting position with the body bent slightly forward, the physician applying one hand in front, over the median line, just above the pubes, while with the other, strokes are applied over the quadratus lumborum. In some cases, also, the fluid is confined to one side of the body, as when encysted or confined by adhesions. In cases of this sort the fluctuations might not be discovered by any other means. This test may also be utilized as a means of differentiating between ovarian cysts and ascites.

Electrical Power of the Torpedo Fish.— D'Arsonval has recently shown that the electrical energy exhibited by the torpedo fish is capable of lighting a ten-candle incandescent lamp, the current produced when the fish is suddenly attacked being sufficient even to vaporize the filament. When measured, the current was found to have a potential energy of 1520 volts, and a quantity of 2–10 amperes.

New Iodide of Potash for Tapeworm.— Dr. Newington reports the discovery that a mixture consisting of hydriodate of potash thirty-six grains, iodine twelve grains, and water one ounce, is an excellent remedy for tapeworm. The mixture was given in doses of ten drops in water three times a day. In one case a tapeworm eleven yards long was passed soon after the use of the remedy was begun.

The Infiltration Method of Local Anesthesia.— Dr. Schleich has proposed a new method of producing local anesthesia. It is based upon the fact that the tissues, when distended with fluids, lose their sensibilities. This has been proven to be true of the bones as well as of the soft tissues. The following solutions are used by Dr. Schleich:—

STRONG SOLUTION, No. 1.

℞ Cocain muriat.....gr. iii.
Morph. muriat.....gr. 1–3.
Natr. chlor.....gr. iii.
Aq. dest.....ad oz. iii.
M. Sterilisat., adde sol. ac. carbolic, 5 per cent., gtt. iii.

MEDIUM-STRENGTH SOLUTION, No 2.

℞ Cocain. muriat.....gr. iss.
Morph. muriat.....gr. 1–3.
Natr. chlor.....gr. iii.
Aq. dest.....ad oz. iii.
M. Sterilisat., adde sol. ac. carbolic, 5 per cent., gtt. iii.

WEAK SOLUTION, No. 3.

℞ Cocain muriat.....gr. i–6.
Morph. muriat.....gr. i–12.
Natr. chlor.....gr. iii.
Aq. dest.....ad oz. iii.
M. Sterilisat., adde sol. ac. carbolic, 5 per cent., gtt. iii.

Solution No. 1, Dr. Schleich uses for operating on inflamed or hyperesthetic areas; No. 2, for most operations; No. 3, for superficial operations on nearly normal tissues.

Castration for Hysteria.— Charcot takes strong ground against castration for hysteria, and declares that the ovarian and menstrual disturbances met with in hysteria are due to the general disease from which the patient is suffering, and are in no way the cause of the hysterical manifestations. He states that he has never seen a case in which the removal of the ovaries in a case of hysteria would be considered a justifiable operation.

A New Sign of Measles.— Dr. Bolognini reports the discovery of a new symptom of measles which is observed very early in the disease, or immediately preceding the eruption, being found present at the beginning of a fever. It is sometimes seen even before the fever, when the only symptom is a slight discomfort. It occurs, sometimes, however, only after the appearance of the eruptive stage. The symptom consists in what the doctor calls the peritoneal friction. The patient is placed upon the back, with the thighs flexed, and the tips of the three middle fingers of both hands held close together. Pressure being made upon various regions of the abdomen, at first very lightly, then harder, a peculiar sensation like that of rubbing

together two rough surfaces is felt. The sensation is not felt everywhere, only at certain points. It also seems to be somewhat transient, disappearing after being excited by a series of rapidly repeated pressures. Dr. Bolognini believes the symptom to be due to an eruption of the peritoneum. In two or three cases he observed the friction before the cutaneous eruption. This observation seems to indicate that an eruption of the peritoneum occurs in measles before the characteristic eruption of the skin.

Insomnia.— The London *Lancet* presents the following thoughts respecting insomnia : —

"Insomnia is really a mere symptom, and will no more be treated *per se* by the intelligent practitioner than the eruption of an infectious fever or the diarrhea of typhoid fever. The great duty of the medical man is to trace it to its causes and its associations, and to deal with these. If it follows influenza, it must be regarded, like all the other *sequelæ* of that protean disease, with some patience, but with much conviction that it will yield, sooner or later, to sound treatment. A very important point is to ascertain whether the insomnia is attended with pyrexia or otherwise, for of all means for producing restlessness, and marring the night's repose an increase of two or three degrees in the temperature is among the most effective. Apart from general pyrexia, it is well to note all local peculiarities of heat, whether in the direction of excess or defect — cold feet, a hot bed, etc. — and to deal with them accordingly. It is, of course, equally important to ascertain any error of function that can reasonably be associated with such a symptom. Such errors may frequently be found in the gastric or renal or hepatic functions, and their removal will quickly alter the whole complexion of the patient's life both by night and by day."

Galvanism to the Pneumogastric in the Vomiting of Pregnancy. — M. Champetier reports five cases in which the irrepressible vomiting of pregnancy was relieved by the application of galvanism. The positive pole is placed just above the right clavicle, between the two portions of the sterno-cleido-mastoid muscle, the negative electrode being placed at the umbilicus. The strength of current employed was eight to ten milliamperes, the length of application from fifteen to thirty minutes. This method is an old one, but latterly seems to have been rather lost sight of.

For Inflammatory Condition of the Skin, Attended by Itching.— To five parts each of French chalk and powdered starch add two parts of glycerin and ten of Goulard water. In using, shake the bottle thoroughly, pour out a small quantity, add twice its volume of water, mix well, and apply to the affected parts with a brush. Leave the parts exposed until the solution is dried, when the surface will be found covered with a thin coating of powder, which is cooling and antiseptic in its action, and relieves itching. If the solution is found at all irritating, replace one half the lead water by at least one half of one per cent. of a boracic acid solution. This preparation should be used only in conditions in which there is a poisonous moisture discharged, and in which irritation and itching exist. It is especially useful in chronic eczema, eczema of the anal region, lichen, and psoriasis.

Retention of Fetus for Fifteen Years.— M. Folet, of Lisle, recently reported to the Academy of Medicine, of Paris, the details of a case of twin-tubal pregnancy, in which the fetus was removed after it had been retained for fully fifteen years. The only inconvenience the patient suffered was from a recent attack of peritonitis, resulting in very extensive adhesions.

Cold-Bath Treatment for Typhoid Fever.— The *American Medico-Surgical Bulletin* publishes the following excellent abstract of an article with the above title, which has recently appeared in the *British Medical Journal* : —

"Although the cold-bath treatment of typhoid is identified with Brandt, of Stettin, it really originated with Dr. Currie, of Liverpool, in 1787. After his death, it lapsed until it was revived by Brandt in 1861. The indications for

the bath are a continued temperature of 102° to 104° F. for several days, with marked evening rise, and no local lesion, like pneumonia, to account for it. The temperature should be taken half an hour before the bath, and regularly every three hours. Whenever the rectal temperature rises to 102.2° F., the bath should be repeated. In some cases a tepid bath at 87° or 90° F. for thirty minutes is better borne; in others, a bath at 66° or 78° F. for fifteen minutes. When the temperature no longer rises to 102.2° F., but still remains above normal, a warm or tepid bath for fifteen to thirty minutes night and morning is beneficial and grateful to the patient.

"The author has compiled from various sources the following code of rules: —

"1. A temperature of 102.2° in the rectum calls for a bath, and it must not, as a rule, be permitted to rise higher without giving the bath, unless the patient is in a sound sleep.

"2. The bath, long enough for the patient to lie at full length in, is brought close to the bedside, and the patient carefully lifted in and out in the horizontal posture.

"3. Half an ounce or an ounce of old pale brandy in two or three ounces of soda or aërated lime-water to be given first (in case of adult).

"4. The patient must always pass water before being put in the bath.

"5. The patient is to be immersed up to the neck; the head to be constantly sponged; and the chest and extremities, not abdomen, to be gently rubbed by an attendant.

"6. The first bath should be given at 90° or 85° F., and cooled down by adding cold water to 75° or 70°. If the patient bears it well, subsequent baths may be given at 80°, and cooled down to 70°. The cold water is poured over the patient's head and chest.

"7. Average duration of bath should be ten minutes; some say until patient begins to shiver; but if he begins to feel cold, or gets uneasy, the bath must be cut short. Where a patient is nervous, or bears the cool baths badly, he must be kept in tepid ones at 87° F., for fifteen, twenty, or thirty minutes, the more prolonged immersion producing the desired effect.

"8. Lift the patient carefully on to a couple of large, soft bath-towels laid over a mackintosh sheet, and rub him dry briskly, except the abdomen, which dry gently; envelop him in a warm blanket, and put him in bed, covering lightly, and give a cup of warm coffee and milk or peptonized cocoa and milk.

"9. Half an hour afterward take the temperature, in the rectum preferably, when it should be two or three degrees lower.

"10. Take the temperature every three hours; and as soon as it again rises to 102.2° F., repeat the bath, unless he is sleeping, when, as a rule, he must not be disturbed, even if the temperature rise to 104°, but the bath deferred till he awakes.

"11. Usually a bath is indicated every six hours. Sometimes, however, during the fastigium the pyrexia is so obstinate and uncontrollable as to call for a bath every two or three hours.

"12. During the night, baths are seldom called for except by an extremely high temperature.

"13. In case the bath lowers the temperature only one degree or less, or only for a very short interval, it becomes necessary to lower its temperature to 66° (cool bath) or even 45° (cold), and lumps of ice may be put in the bath to cool it down with perfect safety. In Strümpell's experience, baths below 73° F. are seldom needed. He regards 80° to 85° F. as the average.

"14. If intestinal hemorrhage occurs, baths must be discontinued.

"The advantages of the bath treatment are: (1) Diminution of fever and calming of the nervous system; (2) disappearance of headache, stupor, and delirium; (3) irritability of the gastro-intestinal mucous membrane more or less relieved with less thirst, vomiting, and diarrhea; (4) improvement of the pulse; (5) diminished dehydration of tissue and lessened danger of bed-sores; (6) diuretic action on the kidneys; (7) reduction by fifty per cent. of mortality. The objections to the treatment are: Expense, public prejudice, nervous dread of patients, and increased frequency of relapse. The contra-indications are: Peritonitis, perforation, hemorrhage, and advanced cardiac weakness. Broadbent does not think albuminuria or pulmonary complications prohibitive."

BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL REVIEW, from original sources.]

OYSTERS AND BACTERIA.

DR. FOOTE, demonstrator of bacteriology in the medical department of Yale University, made, a few months ago, some interesting studies of the oyster with special reference to its relation to the typhoid bacillus. That there is danger of contracting typhoid fever through the use of raw oysters is very clear from the following facts condensed from Dr. Foote's paper: —

Freytag found that the typhoid bacillus will live in a concentrated salt solution for five months.

Giaxa detected typhoid bacilli in unsterilized sea-water nine days after infection, and in sterilized water twenty-five days after infection. Dr. Foote's experiments gave similar results. He observed that a low temperature preserved the life of the bacillus, the vitality of which was not injured by freezing.

Examination of the stomach and liver of the oyster showed them frequently to contain living microbes. One of the most interesting experiments made by Dr. Foote consisted in the inoculation of the oyster with typhoid bacilli, and the subsequent examination of the oyster juice and parts of the oyster at various times, for the purpose of determining how long the typhoid bacillus will retain its vitality in the oyster itself. As the result of these experiments, it was shown that the typhoid bacillus lives readily in oyster juice, and possibly multiplies, and that it penetrates the stomach. Many bacilli were found in the oyster juice and in the stomach of the oyster a month after infection, from which it appears that typhoid bacilli may live even longer in the oyster than in the water which surrounds it, from which they usually disappear within three weeks when new infection does not occur. The oyster is therefore shown to be not only a carrier of typhoid bacilli, but a means of preserving them, so that the use of raw oysters would appear to be really more dangerous than the use of water which is more or less liable to pollution.

Bacteria in Railroad Cars. — An examination of the dust of railroad cars made in Germany under the directions of the Imperial Board of Health, showed in fourth-class cars more than twelve thousand germs per meter, and in first-class cars about one fifth this number. Some of the animals inoculated with the dust died of tuberculosis, showing the presence of this germ with the other miscellaneous microbes, of which railroad carriages, as at present managed, furnish a very large assortment.

Tubercular Infection through Milk. — An investigation of the milk supply of Boston, made under the supervision of the Massachusetts Agricultural Experiment Station at Forest Hills, showed tubercular bacilli in the milk of twelve out of thirty-six animals furnishing milk for distribution in the city of Boston. It is interesting to note that in none of these cases was there any infection of the udder. Tuberculosis was communicated to guinea-pigs by the milk from six of these cows. Experiments made with different animals showed that four per cent. of rabbits, fifty per cent. of guinea-pigs, and thirty per cent. of calves were infected by milk from the tuberculous animals. Of thirty-three samples collected from various sources in Boston to test the general milk supply, tubercle bacilli were found in one sample, which communicated the disease to rabbits inoculated with it.

Immunity against Cholera. — We are sorry to note that M. Haffkine has been compelled to leave his work in India on account of failing health. This indefatigable worker has done much to establish the feasibility of protection against cholera by inoculation. Although Ferrán and the Klemperers had previously pioneered the way toward the splendid results which have been obtained by M. Haffkine, it required the untiring energy and perseverance of the last-named bacteriologist to demonstrate the entire feasibility and the great practical value of anti-choleraic inoculations. Ferrán reduced the mortality in cholera from thirty-three to three in one thousand, and the infections, from seventy-six to twelve in one thousand, during the great epidemic in Spain. Haffkine

has in some cases succeeded in actually obliterating the disease by inoculations.

Osteomyelitis Caused by the Bacterium Coli Communis. — To what extent the bacterium coli communis is responsible for osteomyelitis we are not prepared to state definitely. Akerman, writing in the *Arch. de Méd. Expérimentale*, gives the results obtained by him in a series of experimental investigations. Bacterium coli communis, injected into the veins of young rabbits, produced inflammatory lesions of the osseous system, resembling in many of their characteristics those produced by the organisms of suppuration. Infiltrations of embryonic cells occur in the soft parts of the bone. In a later stage softened foci and circumscribed abscesses are formed beneath the periosteum and in the interior of the bone. These lesions are especially common in the neighborhood of the epiphyses, and are always multiple. Occasionally the process is more chronic, and portions of bone undergo slow necrosis, with a resulting sequestrum. This author is convinced that many cases of osteomyelitis are due to infection by the bacterium coli communis.

Effects of High Pressure on Germs. — Dr. Roger, a French physiologist, has been making a series of experiments to determine the influence of pressure upon bacterial life. He found that a pressure of 550 lbs. had no influence upon pus-producing germs, germs of erysipelas, bacillus coli, and several other pathogenic organisms. A pressure of 3000 atmospheres had no influence upon the bacillus coli, but slightly attenuated the anthrax bacillus.

Bactericidal Properties of Sea-waters. — Pina (*British Medical Journal*) has shown : —

1. That sea-water begins to exhibit an attenuating action upon microbes after three hours.

2. That this action continues for several weeks, at the end of which time the virulence of the microbes is entirely destroyed, but that they continue to grow.

3. This property of sea-water is possessed by water from all depths.

4. The greater the distance from the shore, the smaller the number of microbes to be found in the water.

5. Water used for street sprinkling should be taken from a safe source, so as to make sure that it is free from pathogenic germs.

The Nature of Immunity. — Mesnil, in experiments with fish, has found that germs introduced into their abdominal cavity are taken up by certain cells in the interior of which they are destroyed. In the case of perch, no eosinophil cells were found, from which it is argued that the microbes were not destroyed by the peculiar products secreted by the eosinophil cells.

Dr. J. W. McLaughlin, of Austin, Texas, has discovered a micrococcus which is peculiar to dengue. The coccus discovered is quite unique. As seen under the microscope, the cocci are arranged in filaments consisting of segments. Each segment consists of a large coccus surrounded by several smaller ones. The cocci are encapsulated, and are found in the blood, in which they invade the red corpuscles.

The Time and Temperature Required to Destroy the Micro-organisms of Milk. — Dr. J. Forster, of Amsterdam, has prepared the following table as the result of a large number of experiments : —

131°	F.	for	4 hours.
140°	"	"	1 hour.
149°	"	"	15 minutes.
158°	"	"	10 "
176°	"	"	5 "
194°	"	"	2 "
203°	"	"	1 minute.

The Diphtheria Bacillus under a Low Temperature. — Experiments made by Abel have shown that the diphtheria bacillus is capable of resisting a very low temperature for weeks without injury.

Culture Media for the Pneumococcus. — Dr. Mosny employs the blood serum of rabbits without previous heating as a culture medium for the pneumococcus. The serum of rabbits is found to be superior to that of dogs, cattle, sheep, donkeys, and all other animals.

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ARE MICROBES NECESSARY FOR NUTRITION?

DUCLAUX, of the Pasteur Institute, Paris, contributed to the *Comptes Rendus*, in 1885, an interesting article in which he showed that germination of beans takes place readily in a soil rich in organic matter, but wholly deprived of microbes. During this germination no change whatever took place in the soil, which was composed of milk, cooked starch, and sugar. Duclaux was led by his observations to the conclusion that the nutritive life of a young plant is practically the same as that of an animal. By means of special digestive ferments which are produced in it during the process of germination, and in some plants at a special season, as in springtime before the leaves are produced, the plant digests the food which has previously been stored up for it in the grain, or, as in the case of the maple-tree, in its roots.

When M. Pasteur was made acquainted with these researches, he took great interest in the matter, but expressed the idea that animals could not be thus nourished without the aid of microbes. He suggested, however, that some one should make the experiment of undertaking to nourish a young animal from its birth with pure nutritive substances artificially deprived of microbes. The opinion which Pasteur then expressed, that under such conditions life would be impossible, seems to have been generally adopted by bacteriologists and physiologists, although no experiments were undertaken for the purpose of obtaining scientific data upon the subject.

Nencki opposed the idea of Pasteur upon this subject, calling attention to the fact that the products of bacterial action are, as a rule, aromatic acids, fat, phenol, skatol, indol, ammonia, and gaseous substances, which are not only of no nutritive value to an animal, but are actually harmful, requiring to be eliminated by the excretory organs. "Why, then," said Nencki, "should bacteria be assigned a rôle in the process of digestion?"

Duclaux questioned Pasteur's position, on the ground that the animal body does not require the aid of bacteria in preparing for absorption the various food substances which nourish it, because it is furnished with an abundant supply of digestive fluids for this purpose, admitting, however, that there is a close resemblance between the peptones and other substances formed by bacteria, and thus produced by the animal digestive fluids.

Recently MM. Nuttall and Thierfelder, by the exercise of an infinite amount of labor and ingenuity, have succeeded in overcoming the enormous difficulties of carrying out such an experiment as suggested by Pasteur; namely, the placing of a young animal under perfectly aseptic conditions, supplying it with food and drink absolutely free from germs, removing its excrement, and maintaining its aseptic conditions for the necessary length of time. The animal chosen was a guinea-pig, which was taken from its mother by Cæsarian section performed aseptically, and placed in an ingeniously constructed apparatus in which it could be aseptically cared for, fed, and supplied with water and air, without the admission of a single microbe. The little animal soon accustomed itself to its glass house, its feeding-nipple, and the other conditions which surrounded it, and thrived so well that at the end of eight days, during which time

it had consumed thirty-five grams of food, it was found to have gained ten grams in weight. This showed a gain over its brothers who had been nourished under the ordinary conditions, being fed with non-sterilized milk, and breathing ordinary air. Not a single bacterium was found in its alimentary canal by a most careful search, every tube inoculated remaining sterile.

It is thus demonstrated, as remarked by Duclaux, that bacteria have no physiological rôle to play in the nutrition of the young animal, at least when nourished with purely animal food, though experiments have been made which indicate that with a vegetable diet, germs are more necessary than with a diet of milk.

Experiments recently made at the writer's suggestion in the Laboratory of Hygiene of the Battle Creek Sanitarium, by Professor Novy, of the University of Michigan, show that in healthy adults no living germs are to be found in the stomach at the end of the first hour of digestion when the diet consists of a thoroughly sterilized, farinaceous food. In nine test meals carefully examined, bacteria were found in only two, and in such small number that their presence might be fairly considered as accidental. Further experiments which have been made in the same laboratory by Dr. G. W. Burleigh, working under the supervision of Professor Novy, have confirmed these first observations, more than fifty cases having been observed in which no living germs whatever were found at the end of the first hour of digestion.

From these facts, the conclusion may be fairly drawn that microbes are not at all necessary to the process of nutrition, and hence that their presence is undesirable, since they produce great quantities of ptomains, toxins, and other substances which are often highly toxic in character, and which tax the antiseptic powers of the liver and the eliminative activity of the kidneys, and not infrequently give rise to various disturbing symptoms and morbid processes in the various organs.

STERILIZATION NOT A COMPLETE SAFEGUARD.

THE mystery relating to illnesses which were formerly supposed to be due to an "inscrutable providence," for the reason that no known material cause was discoverable, has been cleared up by the investigations of modern bacteriology. It has long been known that many — most bacteria, in fact — generate poisonous substances which are capable of producing symptoms of most intense poisoning, and even fatal results within a few hours. Some of the most deadly of these poisons, known as ptomains, are produced by the action of germs upon animal foods of various sorts.

The idea that the cooking or boiling of such foods renders them perfectly safe through the destruction of the poisons which they contain, is erroneous, and has led to fatal results in not a few instances. Boiling destroys the germs, or the most dangerous ones, but does not destroy in all cases the ptomains or poisons produced by the germs. This is especially true of the poisons developed in flesh.

European experimenters demonstrated a few years ago that germs begin active development in all parts of a dead animal within twenty-four to thirty-six hours after death, even at the low temperature of an ordinary ice-box.

The *British Medical Journal* calls attention to the danger of depending upon cooking as a means of destroying these poisons, and calls attention to the fact that poisons may be more abundant in one portion of an animal than in another, so that one person might be fatally affected, while others partaking of the same sort of food at the same meal might not be injured. We quote as follows from the eminent authority named: "The poison may be extremely localized in a

particular piece of meat, the rest being free from it; and when we have to deal with a number of fish packed in the same tin, some only may be tainted.

"The prevention of food poisoning is a problem of extreme difficulty. In the meantime, however, we must remain fully alive to all the results of accurate chemical and physiological observations, and not lull ourselves into the feeling of safety while we may be face to face with death, which is all the more deplorable because it is unforeseen and accidental, though fortunately rare."

From the above it is evident that the only safe course for any one to pursue, who wishes to guard effectually against this danger, is to avoid altogether the use of the flesh of animals as food. That this may be readily done without loss of any kind may be inferred from the fact that some vegetables contain the proteid, or albuminous, elements supplied by animal food in even a larger proportion than that in which it is found in flesh. By choosing a proper assortment, such as many primitive natives have learned by experience to make, the vegetable kingdom may be made to yield a much more perfect, symmetrical, nutritious, and wholesome bill of fare than can be derived from the animal kingdom. For example, the Japanese, who subsist largely upon rice, use with the rice the Soja bean, a variety of this excellent legume which contains more than double the amount of nutrient proteid substance contained in beefsteak.

Mental and Nervous Influence in Disease.— The admirable address of Dr. T. S. Clouston before the Royal Medical Society of Edinburg, at the inauguration of its session for 1895–96, presents many physiological facts of interest, bearing upon the relation of mind and body,— or rather, brain and body,— some of which must seem quite novel to those who have not made a special study of the nervous system in the light of the results of the most recent researches.

The lecturer starts out with the assertion that every bodily organ and function is represented in the cortex of the brain, by means of which all are harmonized and unified. Each neuron, with its hundreds of fibers and its thousands of dendrites, has relation to some particular part and function, and is connected not only with all other neurons, but directly or indirectly with multitudes of other similar structures which help to form the brain. Every function of the body — laughing, talking, weeping, digestion, sweating, etc.— is affected through the influence of the brain cortex.

Mental disease means cortical disease, and hence may influence every function of the body. The dry skin, the foul tongue, the constipation, the malassimilation of certain molecules, the greasy, odorous perspiration, the phosphatic urine, and the constantly flowing speech of many maniacal cases are every-day examples. The case of the doctor who loathed purgatives, but secured a good movement of the bowels, notwithstanding obstinate constipation, by putting a dose of salts near his bed at night; and the medical student who, supposing all pills to be laxative in character, was purged by a "leaden opium," are illustrations of the influence of the cortex of the brain upon the bowels; and mental influence applied in such a manner as to secure a movement of the bowels is quite as scientific as a dose of castor-oil.

The evidence that the brain cortex regulates absorption, secretion, vascular tone, as well as the various tissue changes and other activities of the body, is complete. Sores in melancholic persons will not heal. In cases of lung disease in idiots and imbeciles, there is so little resisting power against the tubercular bacillus that two thirds of them die of consumption. Sir Samuel Baker noted

that grief or hunger is nearly always followed by fever in certain parts of Africa. When in Mexico two years ago, we found that quite a proportion of chronic invalids attributed their illness to getting angry, a fit of anger in that country being usually followed by a severe illness. Death occurs in many cases, not so much because of disease as because of the diminished resisting mental and nervous force which opposes it. A bad memory and an attack of eczema in a man of seventy-five may be due to the same cause. A cheerful and buoyant mind as well as a sound brain are all-important in both the prevention and the healing of disease.

Blisters have been caused by suggestions during hypnotic conditions. Constipation has been cured by medicine containing no laxative, but accompanied by the assurance that the bowels would move within an hour. Warts have been charmed away, gout swellings have disappeared at the cry of "Mad dog" or "Fire." These are extraordinary examples of an action just as real, though less patent, of the influence which the brain is continually exercising upon other portions of the body.

Most diseases are aggravated at night when the brain is least active. Most convulsive attacks occur at that time. "What man's courage is as great at three in the morning as at midday? What man's judgment is as clear then?" "Hallucinations, as well as fears, are most apt to appear at night." "To check many diseases we cannot employ better therapeutics than to strengthen the cortex, and thus strengthen the mental energy." "To this end the first thing the good doctor does is to inspire confidence in his patient." Dr. Clouston thus presents a good foundation for a scientific mind-cure which some ingenious therapeutist will doubtless some day work out in detail.

A Case of Oyster Poisoning.— Cases of poisoning from the use of oysters are becoming exceedingly common. The *British Medical Journal* for January 4 reports a case of wholesale poisoning, in which the persons who attended a public ball, nearly five hundred in number, were exposed to infection with typhoid fever through the use of oysters. In quite a number of the cases the illness was very clearly typhoid fever. Investigation showed that the oysters, which were furnished by a Glasgow merchant, were obtained from a bay in Holland, the water of which was polluted with sewage. The investigation of the case has not clearly established the connection of the oysters with the enteric fever, but the bacteriological examination made showed numerous kinds and great multitudes of microbes, and other investigations have traced similar outbreaks to the oyster, by the disclosure, either in the animal itself or its juice, of the specific microbes of typhoid fever.

Wise Words from a Wise Man.— Said the late Dr. Goodell, who was not only a good physician but a good man: "I dare any political economist to show me one expedient whereby conception can be avoided. I challenge him to name a single preventive which will not do damage either to good health or good morals. Even natural sterility is a curse. Show me a home without children, and ten to one you show me an abode dreary in its loneliness, disturbed by jealousy or estrangement, distasteful from wayward caprice or from unlovable eccentricity."

Hydrozone in Genito-Urinary Surgery.— Professor J. A. Fort, of Paris, has devised a new method of dealing with strictures of the urethra by electrolysis, and has recently performed a number of successful operations in the wards of Bellevue Hospital. He reports that after electrolysis he uses an injection composed of one part hydrozone and twenty parts of water morning and evening, under which treatment the wound quickly heals.

Resection of vas Deferens for Hypertrophied Prostate.— The good results which have followed the operation of removal of the testicles in cases of chronic enlargement, or hypertrophy, of the prostate has led to further investigation of this subject. Leguen, a French surgeon, has recently made a series of experiments for the purpose of determining the influence of resection of the vas deferens. He removed about one and a half inches of the vas deferens, thus separating the prostate and the testicle. The results obtained were not so marked as those obtained by the removal of the testicles, but were still decided.

The question we desire to raise, is, whether it is not probable that both the testicle and the duct have an influence over the prostate, just as the ovary and the Fallopian tubes both affect the uterus. In two cases in which the writer has performed the operation of castration for relief of enlargement of the prostate, relief was complete and almost immediate. In a third case, however, relief was by no means so marked. In another case of the same kind, the writer modified the operation by the removal of as large a portion of the vas deferens as could be readily drawn out of the canal, hoping thereby to increase the effects of the operation.

The Douche Massage.— Any one who has ever visited Leukerbad or Aix-les-Bains and has enjoyed the pleasure of a bath at either the quaint old-fashioned bathing-place or the more modern and popular resort, must have been impressed with the peculiar efficiency of the douche massage, which consists in a rubbing, kneading, and shampooing of the patient under a strong stream of either hot or cold water. At Aix-les-Bains the patient sits upon a wooden stool while the water is poured upon him with great force from a hose with a large nozzle, the attendant at the same time kneading and rubbing with varying force and in various directions and upon different parts according to the instruction of the physician.

At Leukerbad the patient stands supporting himself by clinging to a bar or other suitable support, while the douche massage is applied to his back or sides or legs. The force of the stream applied is often so strong as to make it necessary to exert one's self considerably to keep from being forced along with the current of water, which is sometimes almost powerful enough to take one off his feet. At Leukerbad the water is commonly used at a temperature below that of the body. At Aix-les-Bains, hot sulphur water is employed. The effects of the douche massage are quite decidedly different from those of the ordinary massage, being at once powerfully stimulating and derivative.

New Remedy for Asphyxia.— Dr. Bier, a German physician, has made the interesting discovery that the application of ice to the mouth is an effective means of exciting respiration.

Reviews.

Dont's for Consumptives, or the Scientific Management of Pulmonary Tuberculosis.— The above is the title of a work of thirty-five chapters prepared by Dr. Charles W. Ingraham, of Binghamton, N. Y., issued by the Medical Reporter Publishing Co., Rochester, N. Y.

The work is devoted to the general management of pulmonary invalids, in which the author undertakes to present the rational methods of dealing with this great class of patients especial attention being given to non-medicinal agents. The author writes in a lucid and popular manner, making the work such an one as the physician can safely put into the hands of the patient as a mentor. The book will be of service to both physician and aptient in combating this dire malady.

The recognition of the importance of regimen in dealing with consumption has been the means of saving many thousands of lives, until consumption is no longer looked upon as a hopeless malady, but as one in which scientific management and faithful and persevering effort may bring about most encouraging results.

The Battle Creek Sanitarium

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J. H. KELLOGG, M. D., Superintendent.
GEO. W. BURLEIGH, M. D., Bacteriologist.
HOWARD RAND, M. D., Urinalist.
A. B. OLSEN, B. S., M. D., Pathologist.
W. A. GEORGE, M. D., Chemist.

Monthly Résumé of Work Done.

REPORT OF EXAMINATIONS OF BLOOD.

FOR JANUARY.

Blood Count.	Men.	Women.	Total.
Between 4,500,000 and 5,000,000	29	5	34
" 4,000,000 " 4,500,000	25	38	63
" 3,500,000 " 4,000,000	4	22	26
" 3,000,000 " 3,500,000		7	7
" 2,500,000 " 3,000,000	1	1	2
" 1,500,000 " 2,000,000	0	1	1
Totals	59	74	133

Hemoglobin.	Men.	Women.	Total.
100	14	8	22
97		3	3
96	2		2
95		1	1
93	19	27	46
87	1		1
86	1		1
85	11	14	25
79	8	12	20
76		2	2
75	1		1
71	2	5	7
50		1	1
28		1	1
Totals	59	74	132

Gastric Laboratory Report for January.— Regular chemical analysis of the stomach fluid was made in 84 cases; experimental analyses, 33; examinations of the stomach fluid of a dog, 8; total, 125.

The number of patients received from each State was as follows: Michigan, 44; Indiana, 10; New York, 4; Wisconsin, 4; Illinois, 3; Iowa, 3; Ohio, 3; Colorado, 2; Kentucky, 2; Louisiana, 2; Texas, 2; Canada, 1; California, 1; Kansas, 1; Minnesota, 1; Maine, 1; South Dakota, 1; Tennessee, 1; Virginia, 1. Total, 87.

Microscopical Examination of Sputum for January.— Number of examinations made, 36; number of cases, 29; number of specimens in which tubercle bacilli were found, 14.

Patients whose sputum contained tubercular germs, were received from the following States: Michigan, 9; Texas, 1; Colorado, 1; Iowa, 1; Mississippi, 1; Ontario, 1. Total, 14.

Urinary Laboratory Report for January.— Number of specimens examined, 273; number of cases, 217. Number of specimens in which albumin was found, 23; pus, 56; blood, 3; sugar, 6; bile, 2; casts, 5; number of specimens examined for toxicity, 2; number of specimens examined for total nitrogen, 5; number of cases examined for total nitrogen, 2.

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AN ADDITION TO THE DIET IN DISEASES OF THE GASTRO-INTESTINAL TRACT.—There is no class of diseases in which a nicer discrimination is called for in the matter of diet than in affections of the gastro-intestinal tract. Milk, which has been employed to a great extent in these cases, not infrequently excites repugnance, disturbs the impaired digestive process, and is therefore imperfectly assimilated. It must also be remembered that the comparatively large quantities in which it must be administered to maintain the nutrition, sometimes increase the existing irritation of the mucous membrane. In the *Deut. Aerzte. Zeitung* of Oct. 15, 1895, Drs. Gerdes and Susewind state that they have found Somatose, the new food product, of especial utility in the latter condition. As an illustration of its value, they cite a case of severe gastro-enteritis in which all other fluid foods given in larger quantities had been vomited, while the employment of a strong solution of Somatose (one heaping teaspoonful to three tablespoonfuls of water) not only tided the patient over a critical period of fourteen days, but exerted a very favorable influence upon his strength. Despite the continuous high temperature (usually 39.5° to 40° C. at night), the patient was able to leave the bed of his own accord when the fever had subsided. Although the Somatose solution was administered, at first three times, later four or five times, daily for a period of fourteen days, the patient never manifested repugnance, and even during the stage of convalescence, relished its addition to soups or other foods. As an addition to the ordinary diet of anemic and nervous persons, it proved of great value, being well borne, and perfectly assimilated for a long time. In the cases observed by these physicians, an increase of strength occurred within a comparatively short time, and in chlorosis a rapid disappearance of the menstrual disturbances, headache, vertigo, etc., was noted. In some instances, after the use of Somatose a remarkable improvement took place in the digestion; while all patients experienced an increase of appetite which persisted after its discontinuance. Owing to its almost absolute tastelessness, it is especially adapted for the allmentation of children troubled with loss of appetite and to hysterical persons, as it can be added to other foods without impairing their flavor. Somatose, in the solution previously referred to, seems pre-eminently indicated as a nutriment in case of cancer of the stomach and esophagus, where only small quantities of food can be ingested, or after gastrostomy, since its ready assimilability precludes the occurrence of digestive disturbances.

FOR BETTER ROADS.—The governor of Michigan has set a good example for the chief executives of other States in calling a "Good Roads" convention, which is asked to meet in the city of Lansing March 3, 1896, at 2 P. M. The improvement of our public roads is a matter in which every good citizen should be interested. No civilized country in the world possesses such wretched roads as are to be found in America. In England, France, Germany, Switzerland, and even in poor Italy the public highways are almost invariably found in excellent condition, the inhabitants of these old countries having learned long ago that a poor road is an expensive luxury, and one which no government can afford to maintain.

Hon. Alfred A. Pope, of the Columbia Bicycle Company, and others have for a number of years past continually called attention to the enormous loss occasioned to farmers and others by bad roads. It is to be hoped that this convention will devise some satisfactory means for correcting this great evil.

THE nineteenth annual meeting of the American Microscopical Society will be held at Pittsburg, Pa., Aug. 18, 19, 20, and 21, 1896. All workers in the microscopical sciences are invited to be present. Blanks for application for membership, also titles of papers, should be sent to the secretary before July 15, 1896. Address, William C. Krauss, M. D., Secretary, 382 Virginia St., Buffalo, N. Y.

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THE lack of fat and blood is coming to be so universal among Americans as to be almost characteristic. Our typical countryman has a "lean, hungry look," as Cæsar said of Cassius. The leanness is an evidence of the impaired nutrition which he suffers, more or less, as the result of indigestion. The most universal of all forms of indigestion is the inability to digest starch and fats. This doubtless arises from several causes, the chief of which we believe to be the following: —

1. Hasty eating, whereby the food is improperly divided, and an insufficient quantity of saliva is mingled with the food to convert the starch into sugar, as in the normal process of digestion.

2. The use of imperfectly cooked food. Grains which require cooking for from three to five hours to secure prompt digestion are often served at the table after fifteen to thirty minutes' cooking. The manufacturers of various preparations of oats and other grains are largely responsible for this, and have done a vast deal of mischief by printing upon their packages such statements as, "Steam Cooked," "Requires only Fifteen Minutes' Cooking," "Ready for Use in Three Minutes," all of which are untrue. We know of no preparation of oatmeal in the market which does not require cooking at least two or three hours to properly prepare it for the stomach. Raw and imperfectly cooked starch will not digest in the stomach, but will ferment, producing acidity, and thus preventing the digestion of other food.

3. The use of tea and coffee, vinegar, pickles, sour wine, and other acids at meals, all of which absolutely prevent the digestion of starch in the stomach.

4. The use of candy, sugar, preserves, and other sweets, whereby fermentation is promoted, and the digestive organs weakened.

5. The use of mushes, soups, and other soft foods, or "slops," to the comparative exclusion of dry foods. This is perhaps the most important of all causes of starch indigestion.

6. The use of free fats in the form of butter and salad oils, and the admixture of free fats, such as butter, lard, suet, etc., with food in cookery, as in pie-crust, cake, rich gravies, sauces, etc.

These causes, acting singly or in combination, have given rise to such a prevalence of this special form of indigestion as to produce actual modifications in the physical appearance of the average American. Of the multitudes of invalids who are daily suffering martyrdom from heartburn, sour stomach, bloating, eructations of gas, intestinal flatulence, colic, and other distressing symptoms, many might be cured by a combination of appropriate treatment with correct dietary, but there is still left a large number whose digestive organs have been so abused that there is little hope of their being restored to soundness, and the individuals must, in consequence, adopt a dietary suited to the crippled condition of these organs. Some persons of this class find relief in the adoption of a dietary consisting simply of fruits and nuts; others, in an almost exclusive meat diet, not knowing that the temporary palliation of their symptoms is obtained only at the expense of greater suffering in the end.

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Malted Gluten is in a state of fine division, so that when it is taken into the stomach, its fat-forming element is ready for immediate assimilation, and its blood-forming element for very prompt digestion.

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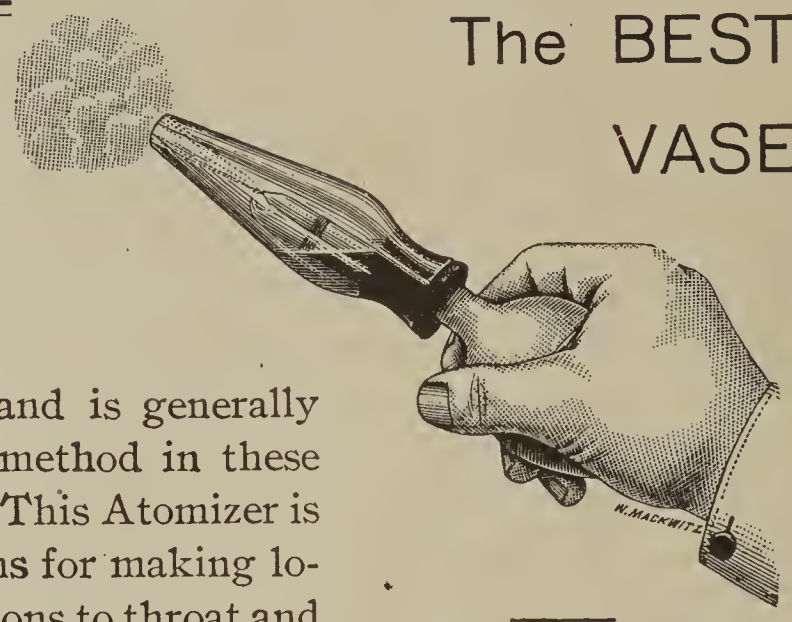

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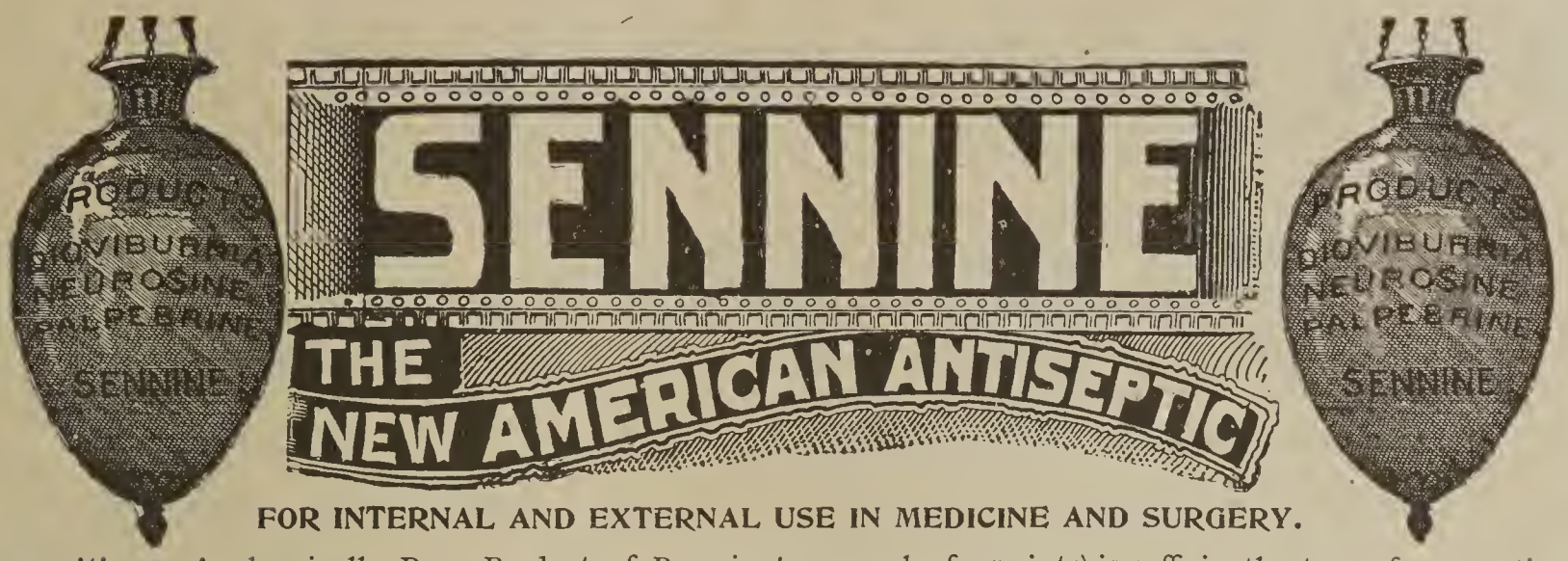

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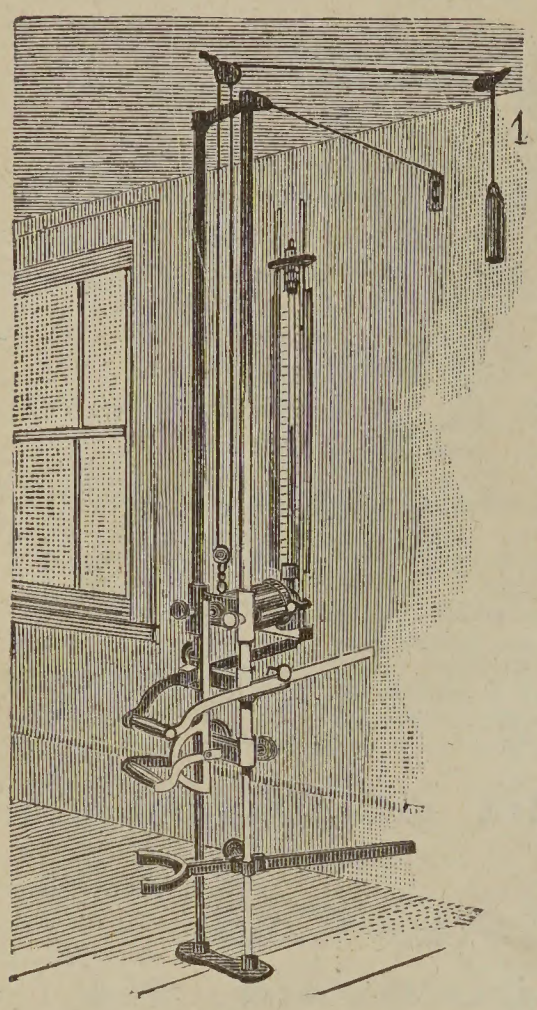

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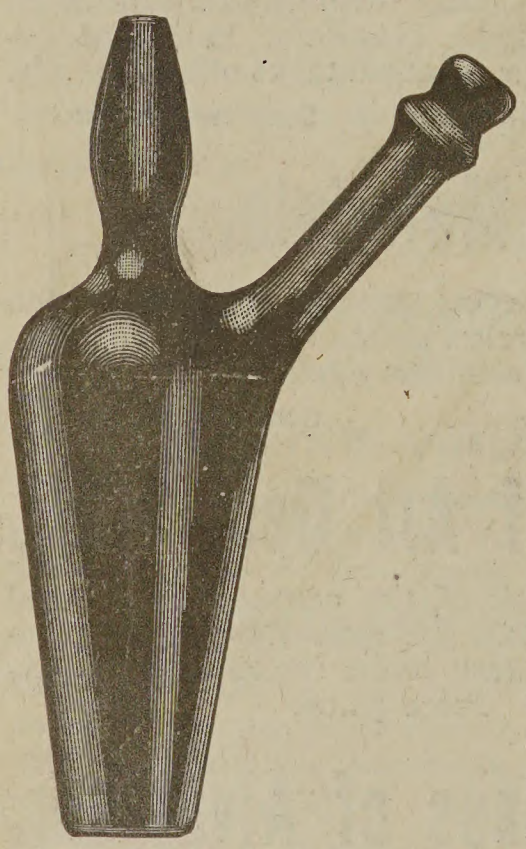

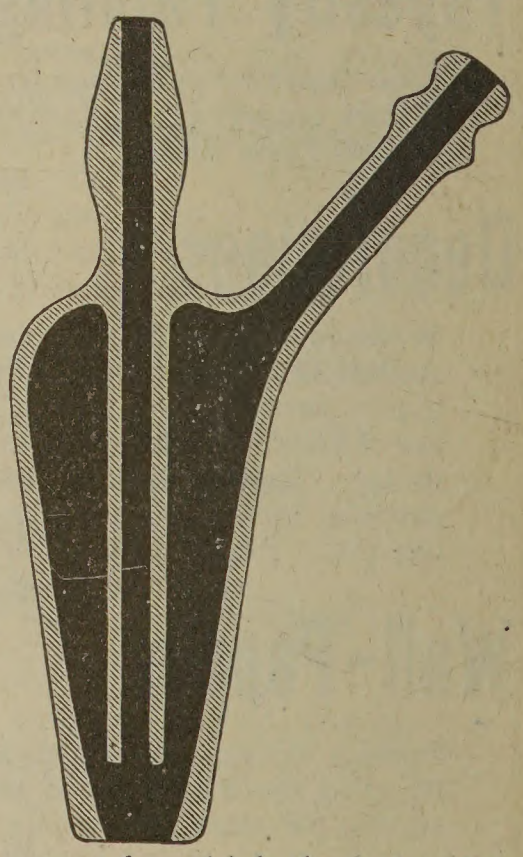

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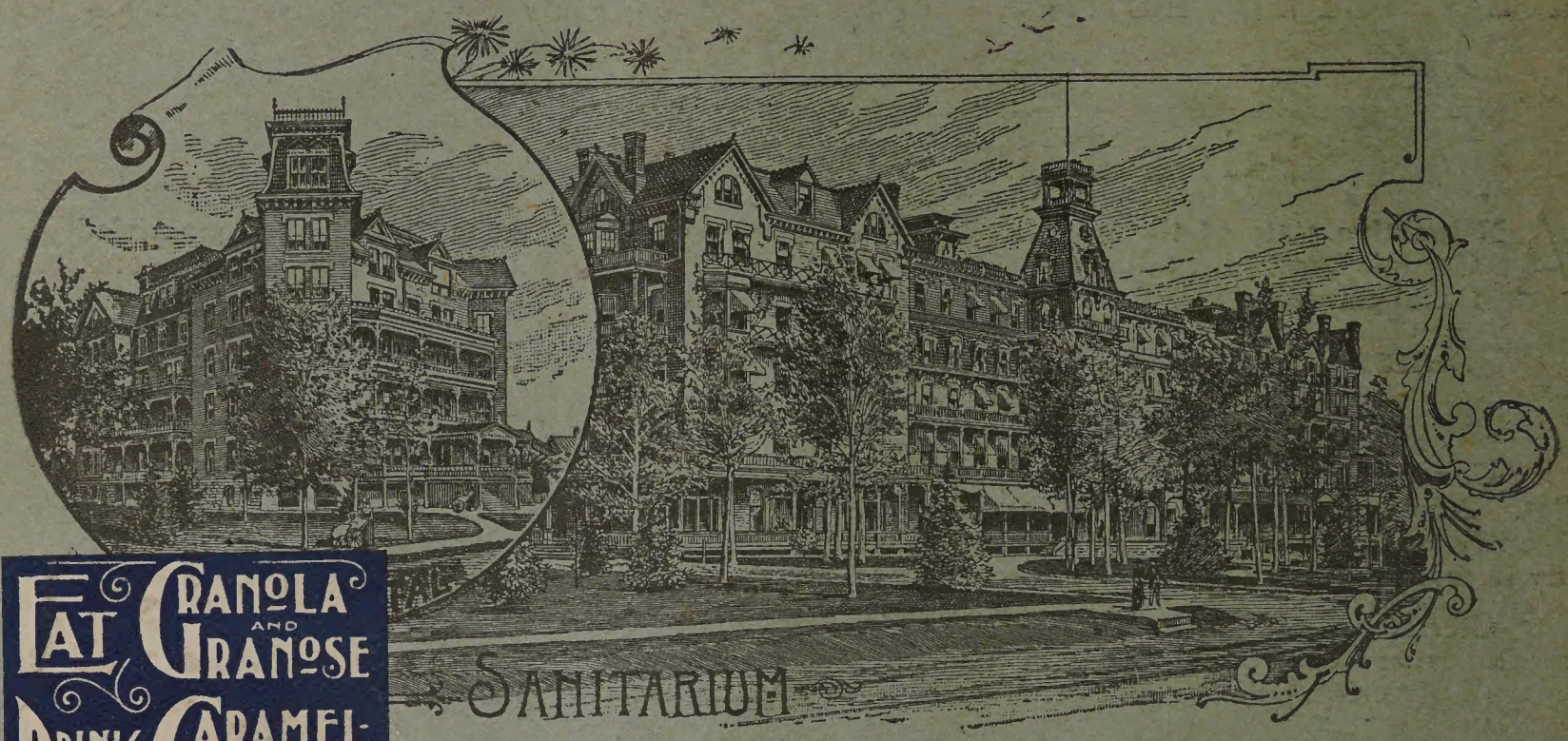

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